November 11, 1946

STEEL

The Magazine of Metalworking and Metalproducing

ESTABLISHED 1882

EDITORIAL OFFICES

TECHNOLOGY DEPT.

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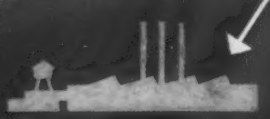
SEAMLESS TUBE MILLS

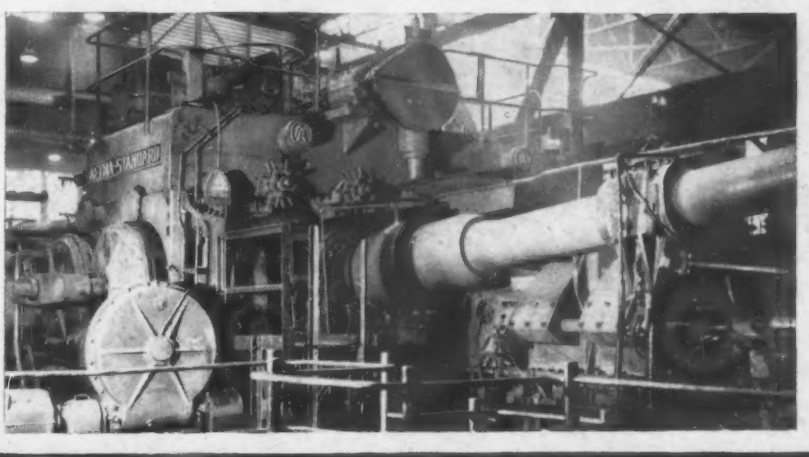
The only company which has engineered a complete seamless tube mill.

The only American company which has built complete seamless tube mills.

No other company has built as many seamless tube mills here and abroad.

Aetna-Standard now building the two fastest seamless tube mills in the world.



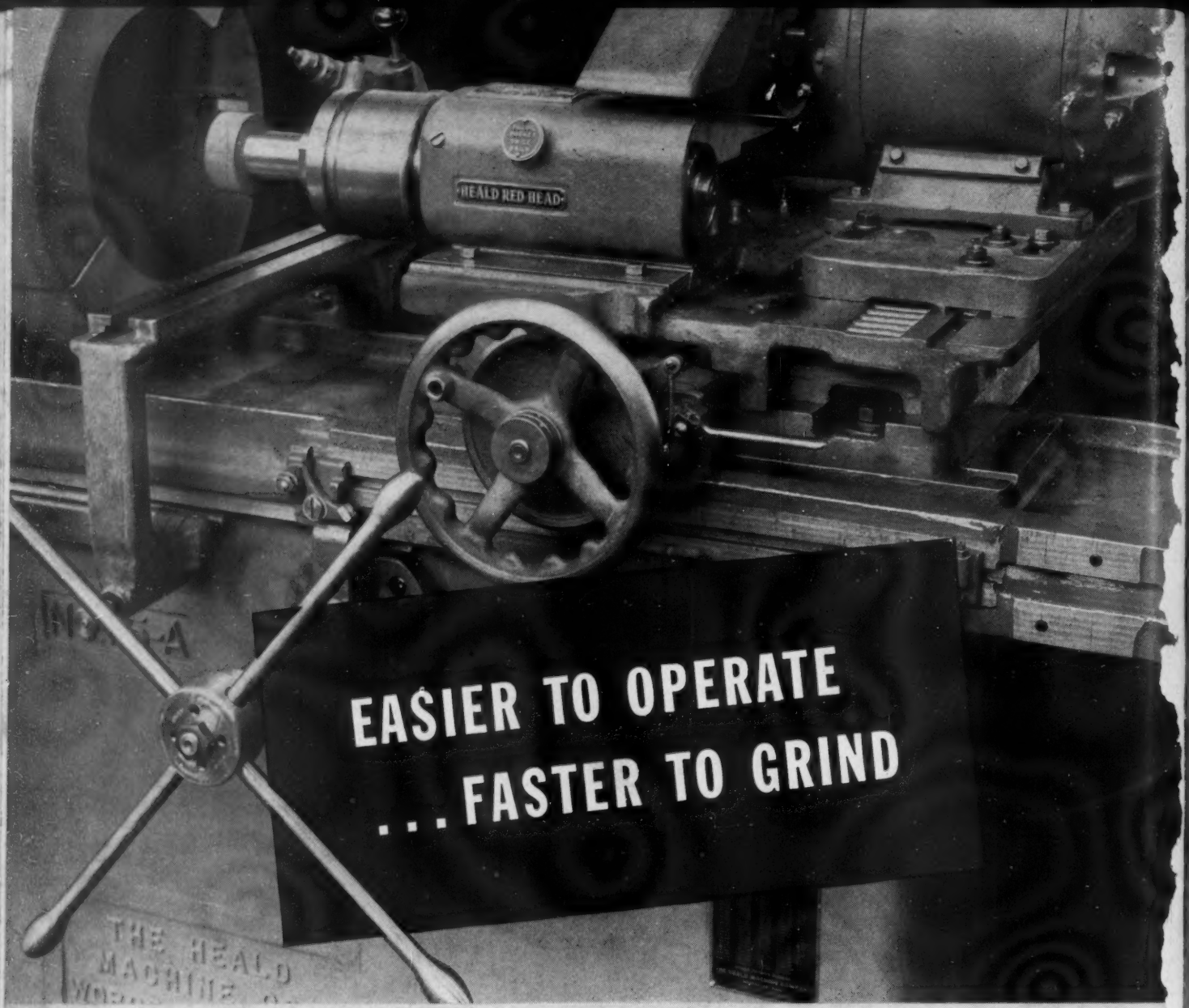


THE AETNA-STANDARD ENGINEERING COMPANY • YOUNGSTOWN, OHIO

Associated Company

HEAD, WRIGHTSON & COMPANY, LIMITED . . MIDDLESBROUGH, ENGLAND

DESIGNERS AND BUILDERS to the Steel, Non-Ferrous and Chemical Industries



It's the Heald No. 75-A Internal, with new anti-friction table ways . . . ready to cut your small-lot grinding costs

EFFICIENCY in small-lot grinding jobs largely depends on ease of operation. And that's one of the outstanding features of the Heald No. 75-A Internal, equipped with new anti-friction table ways for faster, effortless grinding.

Table action on this simple, manually operated Heald Internal is remarkably smooth and easy . . . a mere touch on the handwheel operates the table, hence greatly reduces operator fatigue. Ways are prelubricated for life . . . give instantaneous table response . . . put finger-control precision into small-lot operations.

That's why the Heald No. 75-A Internal is ideal for your tool room—with ample capacity for the general run of face, chamfer and internal grinding. Use it for work up to 2" in length, with either straight or tapered holes, such as gears, pinions, bushings, and rings. You'll find that it increases the range of your work . . . and brings your costs down.

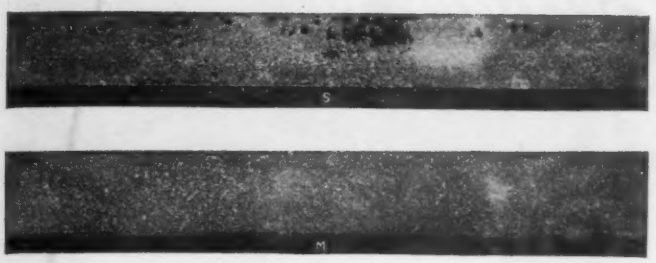
If you'd like to know more about Precision Finishing Tool Room Work and Small-Lots, we'll be glad to send you our latest 40-page bulletin on the subject. THE HEALD MACHINE COMPANY, Worcester 6, Mass.

HEALD

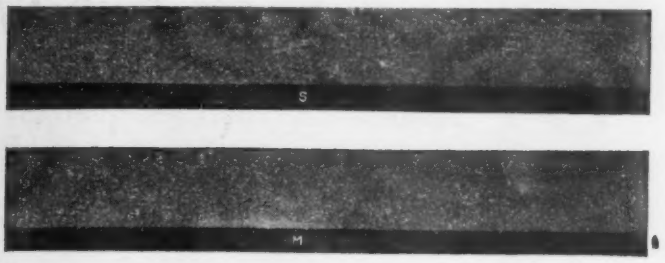
means more precision
. . . less cost

INTERNAL AND SURFACE GRINDING MACHINES • BORE-MATIC PRECISION FINISHING MACHINES

MAYARI R and CARBON STEEL TESTED IN CORROSIVE ATMOSPHERE



After 18 months in corrosive industrial atmosphere, with iron-oxide paint coating. Top piece (S) is carbon steel; bottom piece (M) is Mayari R.



After 18 months in corrosive industrial atmosphere, with red-lead paint coating. Top piece (S) is carbon steel; bottom piece (M) is Mayari R.

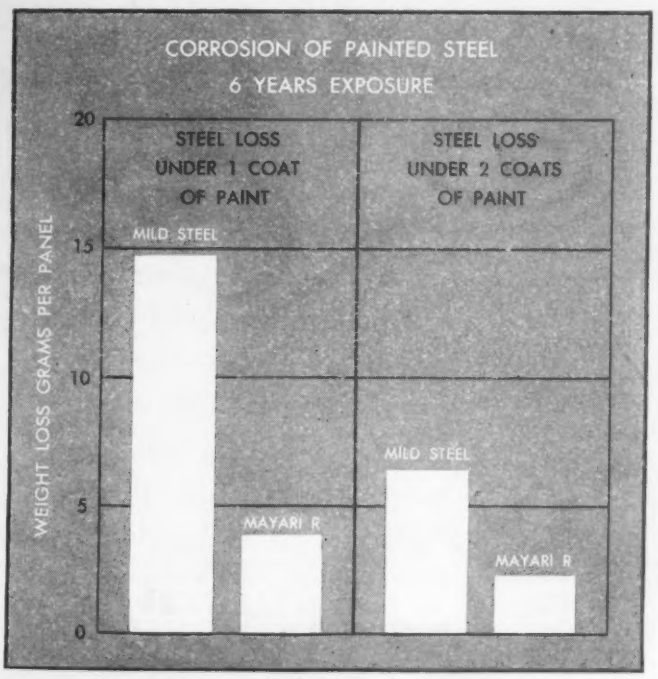
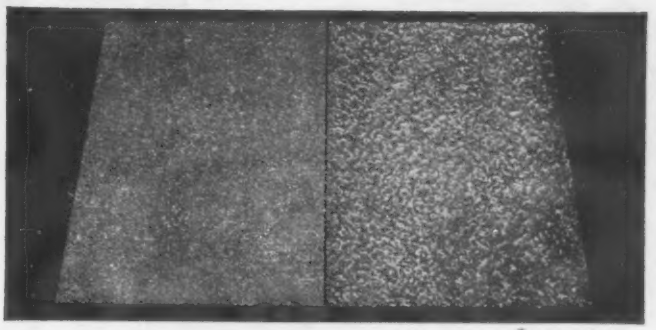
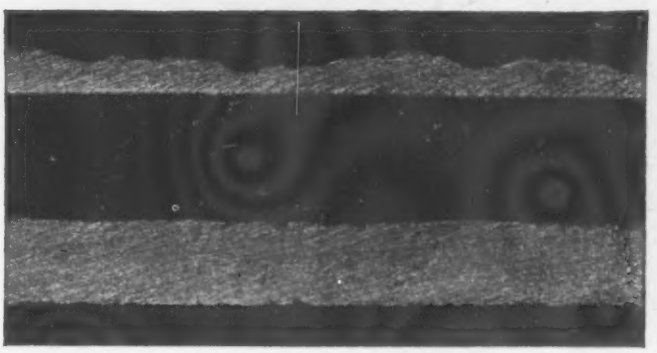


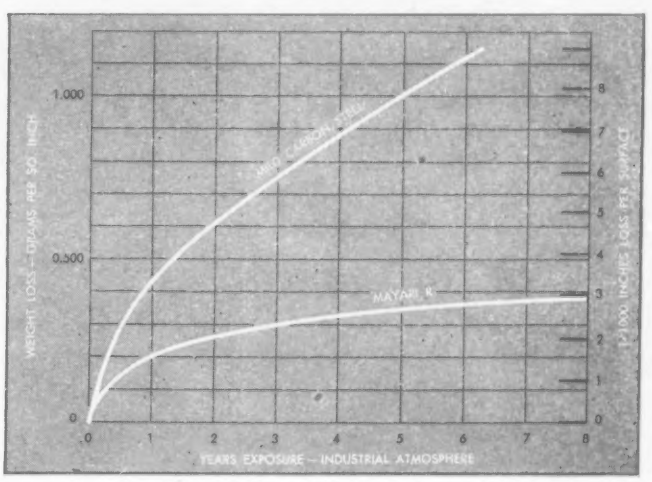
Chart showing average weight losses of painted carbon steel and painted Mayari R. Sheet panels 5 in. by 8 in. of these steels were exposed together.



After 5 years' exposure, surface condition of unpainted 1/8-in. Mayari R sheet (left) and unpainted 1/8-in. carbon steel sheet (right).



Enlarged cross-sections of two unpainted steel sheets, originally of the same thickness (1/8 in.), photographed after 5 years exposure in industrial atmosphere. Top, carbon steel; Bottom, Mayari R.



Curves showing comparative weight losses and corrosion penetration of unpainted carbon steel and Mayari R. Test covers an 8-year period.

Tests show that after exposure in highly-corrosive industrial atmosphere painted Mayari R steel suffers a weight-loss less than half that of painted carbon steel. In the same atmosphere, unpainted Mayari R loses only one-fifth as much weight as does unpainted carbon steel. These results mean reduced maintenance costs and considerably longer life in countless applications where Mayari R is now being used to replace mild carbon steel.

Mayari R has other distinct advantages: it is a low-alloy high-strength material with almost double the yield point of carbon steel. This advantage permits the use of lighter sections to reduce dead-weight without reducing strength of the product. Mayari R is formed, fabricated and welded by the common shop methods.

Write for the new Mayari R catalog which contains detailed information about this corrosion-resisting, weight-saving steel, and shows a wide range of applications.

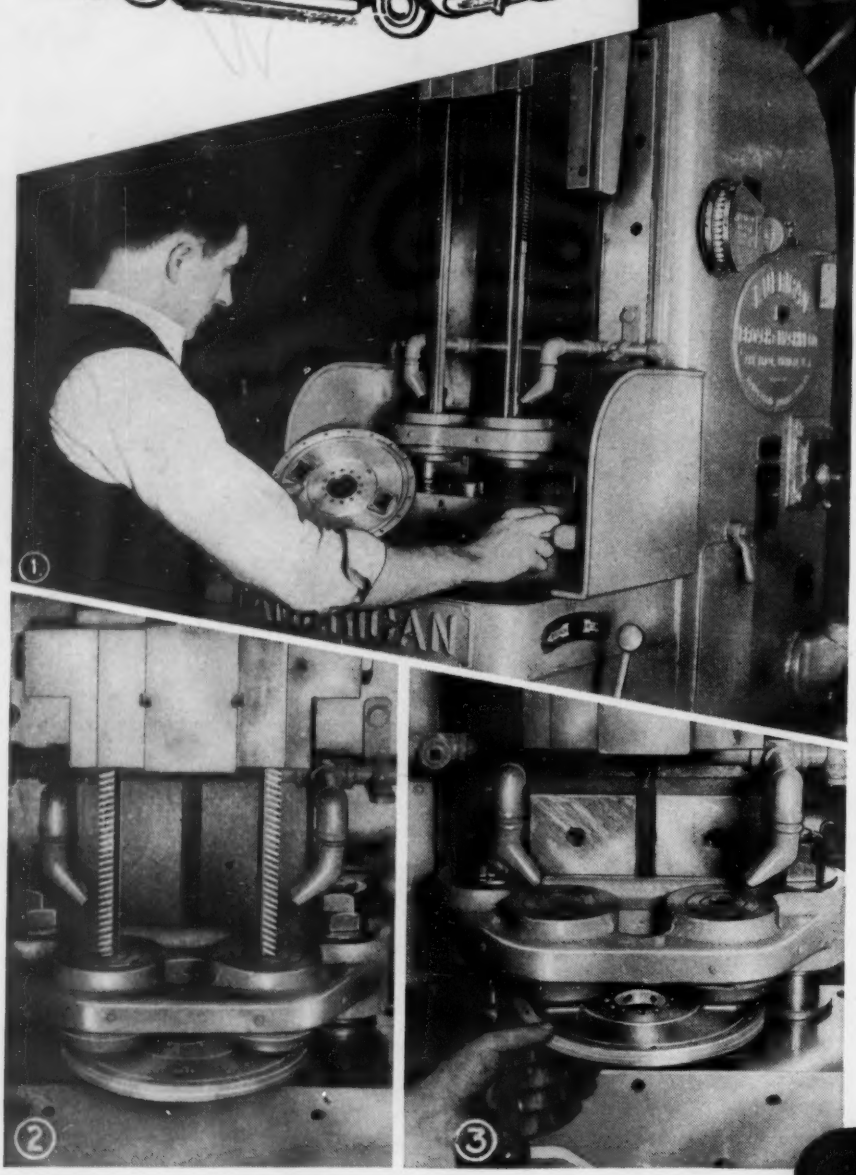
BETHLEHEM STEEL COMPANY
Bethlehem, Pa.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

★ BETHLEHEM STEEL ★

AUTOMOBILES

BUILT BETTER *Because of* BROACHING BY *American*



AMERICAN has designed and built broaching equipment to help form an endless procession of automotive parts. Among the countless pieces manufactured with the help of *American* broaching machines are transmission, steering, generator, differential, hydraulic, ignition, and brake parts, cams, cylinder blocks, gears, and connecting rods.

American's service to industry is three-fold. *American* makes broaching machines and broaching tools; *American* engineering talent is at your service to devise the means of making this equipment useful to you. Write today for further details.

A typical job, performed on a standard *American* T-6-24 broaching machine, is broaching three sides in each of two holes of a diaphragm mounting plate. **Fig. 1** shows the operator about to load and clamp the part in the fixture. Broaches are at upper end of stroke. **Fig. 2** illustrates the machine midway in the broaching cycle. **Fig. 3** shows the part automatically ejected at the end of the broaching stroke. Broaches are returned to "up" position before next part is loaded. The complete cycle takes less than 30 seconds, including loading and unloading.

MEMBER BROACHING TOOL INSTITUTE

American BROACH AND MACHINE CO.

ANN ARBOR, MICHIGAN

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BROACHING MACHINES
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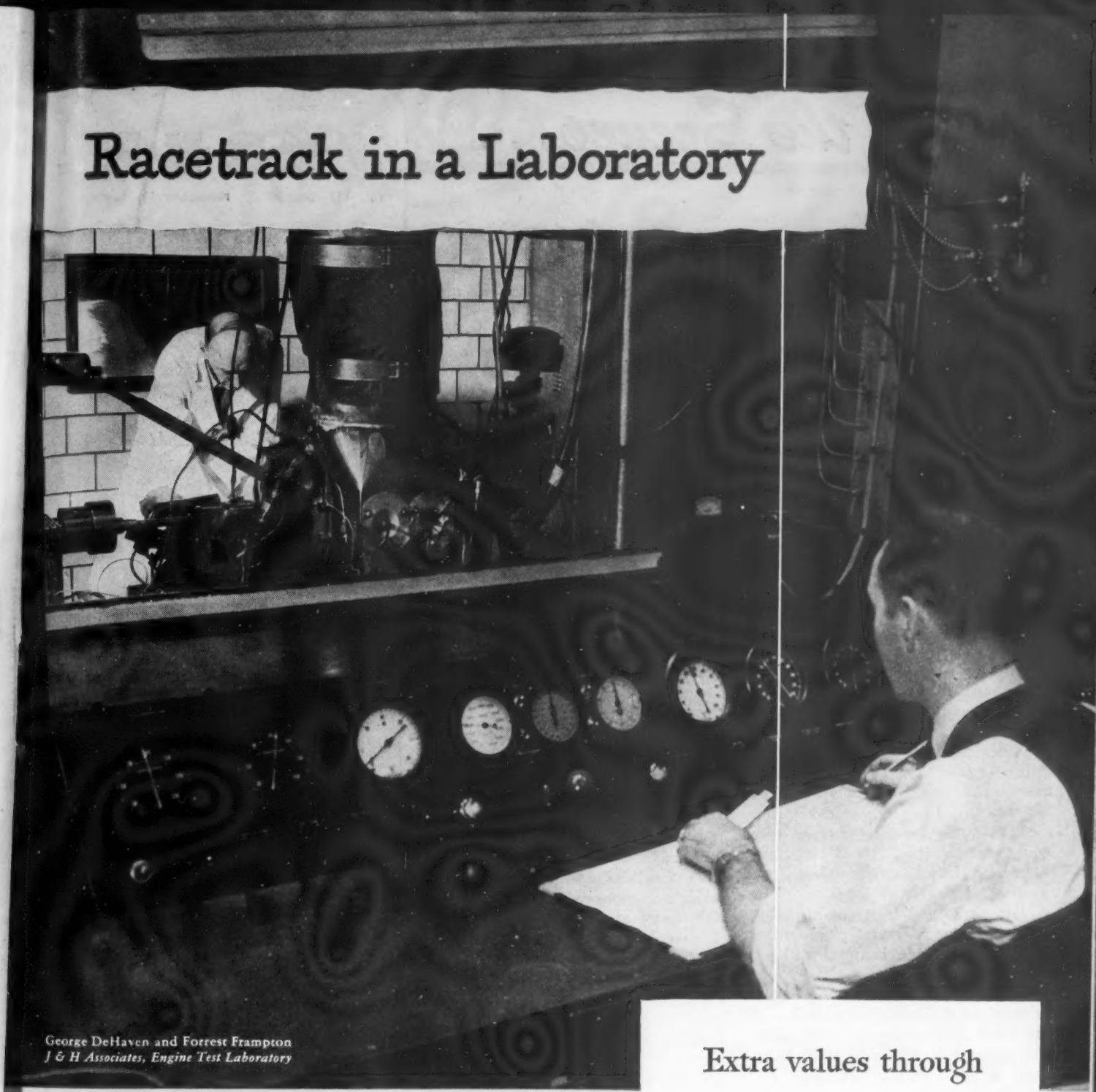
SPECIAL MACHINERY

DIVISION OF SUNDSTRAND MACHINE TOOL CO.

Racetrack in a Laboratory



George DeHaven and Forrest Frampton
J & H Associates, Engine Test Laboratory

Extra values through

JACK & HEINTZ

Mass Precision

You are looking into one of the "torture chambers" of our engine laboratory where the world's largest pressure-die-cast, four-cycle engine is going through its paces. Under sustained tests this new Jack & Heintz slide-valve engine reveals exceptional fuel economy. Its weight is far less than that of conventional automobile engines. It is more efficient and has a much wider speed range.

This new engine is typical of Jack & Heintz achievements through *mass precision.* This rare combination of high precision and mass production is creating better engines, electric motors, refrigeration compressors, aircraft accessories, bearings and magnetos *today,* and is developing other revolutionary products for *tomorrow.*

JACK & HEINTZ PRECISION INDUSTRIES, INC., *Cleveland 1, Ohio*

Behind the Scenes...

We'll Be There, Will You?

The extra outsize dimensions of this issue (which in simple language means that it is just a bigger than usual book) are due to the second Metal Show of this year. We'll be on hand, as usual, and we hope you will be able to make it, too. If you manage to worm your way into Atlantic City, along with the delegates to the CIO convention, look us up. We'll be in booth A-105, come through the main gate and turn to your right. We'll have a couple of soft seats for you to relax in, and we're always ready to make small and insignificant conversation on any given subject. Drop in and take it easy with us.

Labor Up In The Air

A few weeks back we saw an item in a newspaper about pickets taking to the air during the strike at the Steel Company of Canada, Ltd., and we ran a short item in this column about it. Seemed at the time to be a good story, with references to an air battle between the union planes and planes chartered by the company. However, we didn't have the whole story, which makes an even more interesting tale, as told to us in a letter from H. G. Hilton, president of the company. Mr. Hilton's letter says:

"Access to and from our plant by land, including railways, throughout the strike was forcibly barred by illegal picketing. Notwithstanding this, the plant was maintained in operation throughout the strike. We were forced to bring in necessary supplies either by water or by air, and for the latter we had two landing strips on our cinder dump. Air transport was only employed for emergency items and certain perishables required daily.

"On the day in question, the union chartered a plane to drop leaflets on the plant advising the men working that if they would leave the plant, they would be allowed free passage through the picket line. Incidentally, the response was nil and the stunt was never tried again. About the time the union plane was over the plant, one of our planes came in from a trip to Toronto. Matters were further complicated by the fact that two or three newspapers had chartered planes to accompany the union plane, and were also in the air over the plant at the time. Both the pilot of our plane and the pilot of the chartered union plane were experienced war pilots and they knew each other well. They accordingly proceeded to put on a little show and have some fun. At no time during the incident did any planes rise from our property nor was there any attempt to give battle.

"The union started a sensational protest along the lines of your description but pulled in their horns very quickly when they found that the newspapers had photographs showing the union plane flying well below the limit imposed for flying above cities and the pilot they hired could therefore lose his license over the incident."

Thank you, Mr. Hilton, for getting the record straight on this incident. We certainly hope such aerial maneuvers don't cast any portent as to the future course of labor disturbances.

Can't Spell, Either

To Charles C. (deep-in-the-south) Steward and other sharp-eyed readers, a quick view of our very red face. No sooner had the issue of October 28 been irretrievably sealed for posterity than we discovered that our erudite(!) discussion on the English language proved that we couldn't even spell, let alone discuss such important subjects as the frequency of letters in our language. We found out that even the cheapest dictionary spells grammar with two a's. Perhaps subconsciously we were thinking that e is the most common letter in the language, therefore it had a better than even chance of being the right letter for the job, which it wasn't. From our seat on the high stool in the corner we vow that it won't happen again. Now watch us fall over a dictionary again this week.

Stainless Machining

The editors are proud of that series of three articles on machining stainless steels which ran during October. So proud, in fact, that they've asked us to tell you that more reprints have been made available, and anyone who'd like a set can have same by writing a letter to Readers Service Department.

Shrdlu

(Editorial Index—page 103)

STEEL

Vol. 117—No. 20 November 11, 1946

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SHARONSTEEL

GALVANITE*

PREFERRED COATED STEEL

* Galvanite is a high grade Sharonsteel with a patented special zinc coating that is rust-proof. It comes in coils or cut lengths up to 22 inches wide.

The Lengthening Shadow of Quality!

The goodness of Galvanite-coated Sharon-steel can be measured by the ever-increasing number of quality products that come within its "lengthening shadow."

It has become a preferred coated steel with fabricators —*because of what it does.*

Galvanite strip is weather-resisting, non-rusting, suitable for deep drawing and forming. There's no peeling, flaking, or powdering of coating after difficult formation. The surface lends itself to painting.

Sharon also produces galvanized, tin-coated, terne-coated and special alloy coated strip steels of fine quality.

For full information about what Sharon coated products will do for you, write to the nearest Sharon field office, or to the company's home office today.

Also Producers of Stainless Steel, Alloy Steel, High Carbon Steel, Hot and Cold Rolled Strip Steel

SHARON STEEL CORPORATION

Sharon, Pennsylvania

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World's Largest Builder of the World's Largest Cranes

Alliance

lliance makes the equipment to move
slabs, ingots, hot metal, raw material
d finished products safely, quickly, and easily.
For 50-odd years, Alliance has been known as
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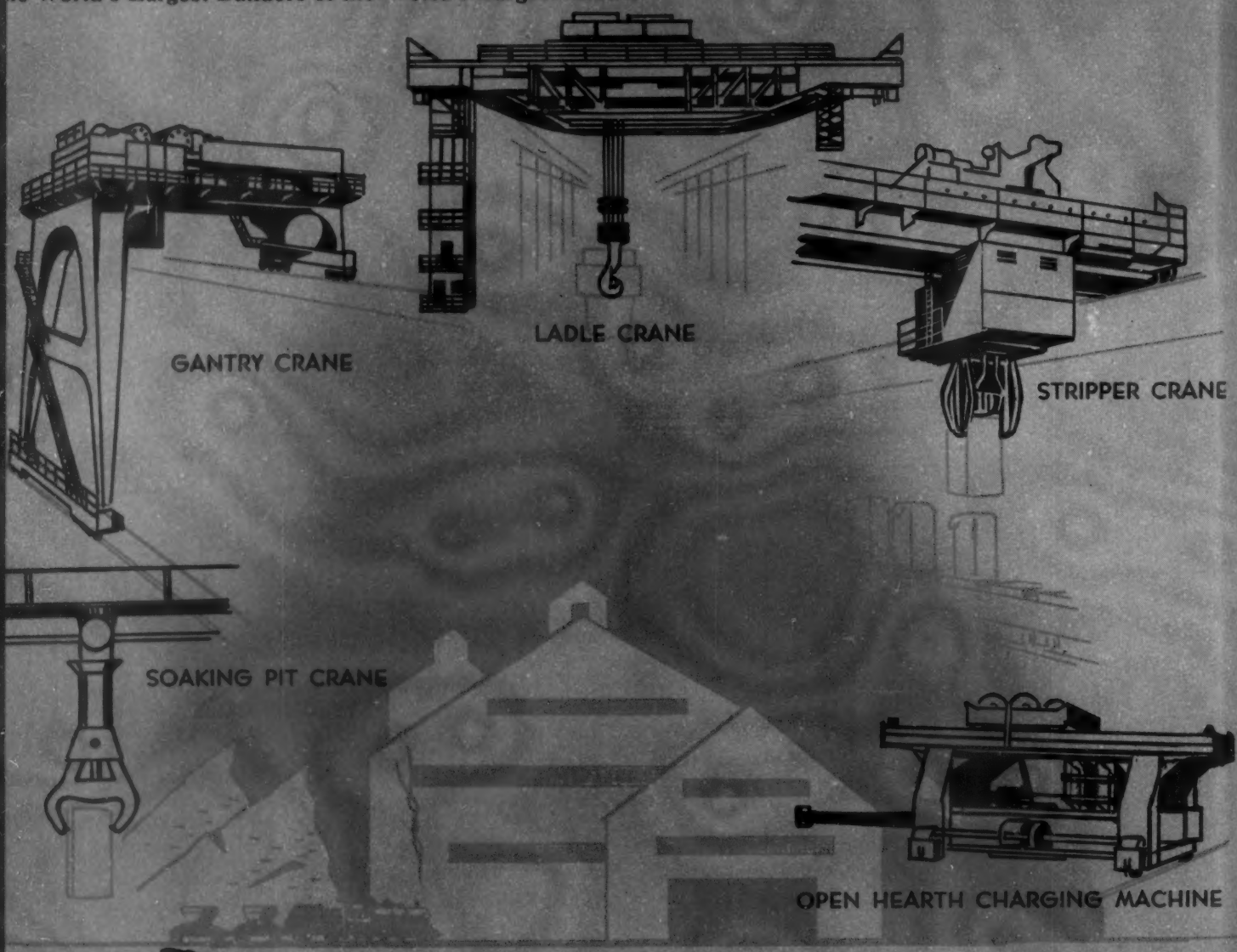


THE ALLIANCE MACHINE COMPANY

ALLIANCE, OHIO · 1622 OLIVER BLDG., PITTSBURGH, PA.

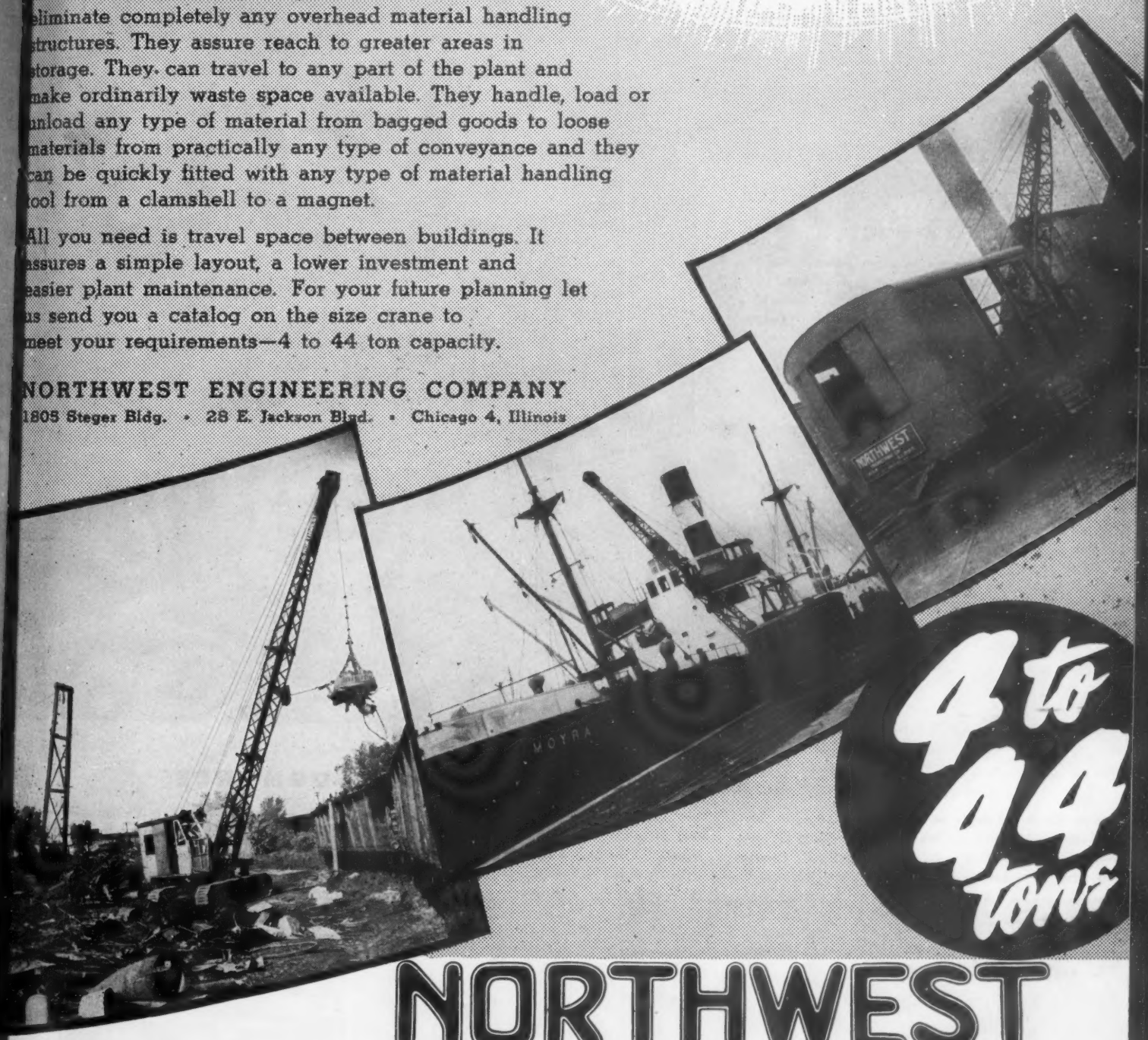
PLAN

YOUR PLANT EXPANSION AND MODERNIZATION *for Flexible Northwest* CRAWLER CRANE MATERIAL HANDLING

Northwest Crawler Cranes take the handicaps out of expansion problems from a material handling standpoint. They reduce the amount of trackage required. They can eliminate completely any overhead material handling structures. They assure reach to greater areas in storage. They can travel to any part of the plant and make ordinarily waste space available. They handle, load or unload any type of material from bagged goods to loose materials from practically any type of conveyance and they can be quickly fitted with any type of material handling tool from a clamshell to a magnet.

All you need is travel space between buildings. It assures a simple layout, a lower investment and easier plant maintenance. For your future planning let us send you a catalog on the size crane to meet your requirements—4 to 44 ton capacity.

NORTHWEST ENGINEERING COMPANY
1805 Steger Bldg. • 28 E. Jackson Blvd. • Chicago 4, Illinois



4 to 44 tons

NORTHWEST

The Crane that goes Anywhere!

THE JOB Stainless steel is difficult to mill under almost any circumstances — but this super-powered CSM, equipped with the proper cutter, literally "walked through" this job.

OPERATION:	Rough Mill Stud	DEPTH OF CUT:	.441" (Max.)
MATERIAL:	Stainless Steel	SURFACE SPEED:	346 SFM
CUTTER:	6" Dia.; 8 Tooth	FEED PER TOOTH:	.020"
TABLE FEED:	21 IPM	MILLING TIME:	26 Seconds

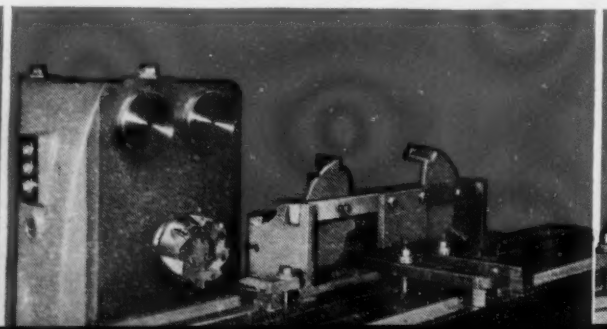
THE PART

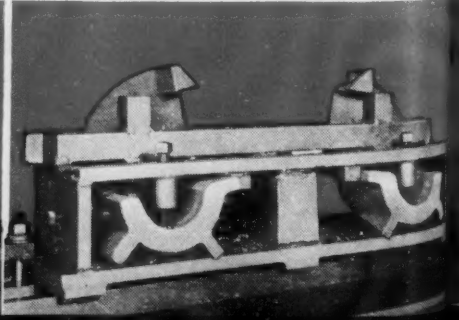
Note the excellent finish obtained despite the high rate of metal removal. The milling time of 26 seconds includes both surfaces. Micrometer stop dial indicator on machine facilitated this step milling operation.

MORE EXAMPLES OF CSM PERFORMANCE

peration: Rough mill angle on knee gib support—with 34% me reduction. Material: C. I.—Speed: 336 sfm—Cutter: 3" dia., T.—Feed per tooth .010"—Depth of Cut: 5/32". Previous illing time: 61 seconds — CSM Milling time: 45 seconds.

Two views of set up for milling socket arm part with 65% milling time reduction. Center shows rear of special holding fixture in place on machine table. At right, machined surfaces of part. Material: Cast Steel—Surface Speed: 346 sfm—Cutter: 6" dia., 8 Tooth—Feed per tooth: .012" —Depth of cut ¼". Previous milling time: 4 min. 52 seconds—CSM milling time: 1 min. 42 sec.





STAINLESS STEEL MILLING

made easy on a

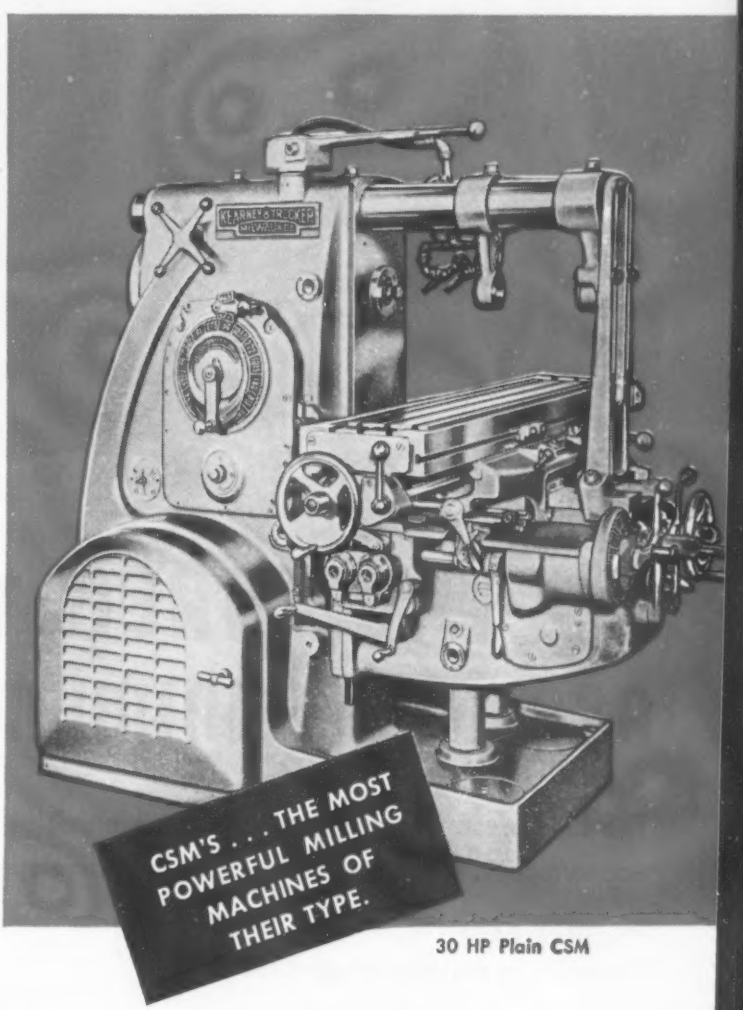
KEARNEY & TRECKER CSM

CSM Milling Machines were designed to obtain the greatest benefits from modern cutting tools, and are now part of our line of standard models. The design has been stabilized after complete analysis of industry's problems of milling with carbide cutters.

Because they are knee type machines, they are readily adaptable to a great variety of work. They are precision built in accordance with long established Kearney & Trecker standards and will cut metals faster and to finer tolerances and superior finishes than ever before — with high speed steel cutters as well as carbide cutters.

CSM machines are available in 20, 30 or 50 H.P. models in both plain and vertical knee types.

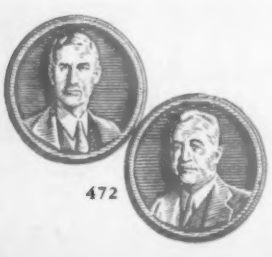
Write for complete data on CSM machines — CATALOG CSM-20. Please indicate your business connection.



30 HP Plain CSM

KEARNEY & TRECKER CORPORATION

MILWAUKEE 14, WISCONSIN



472

"Be ready for tomorrow with CSM's"

THE LANDMACO THREADING MACHINE ASSURES MINIMUM OPERATING COSTS

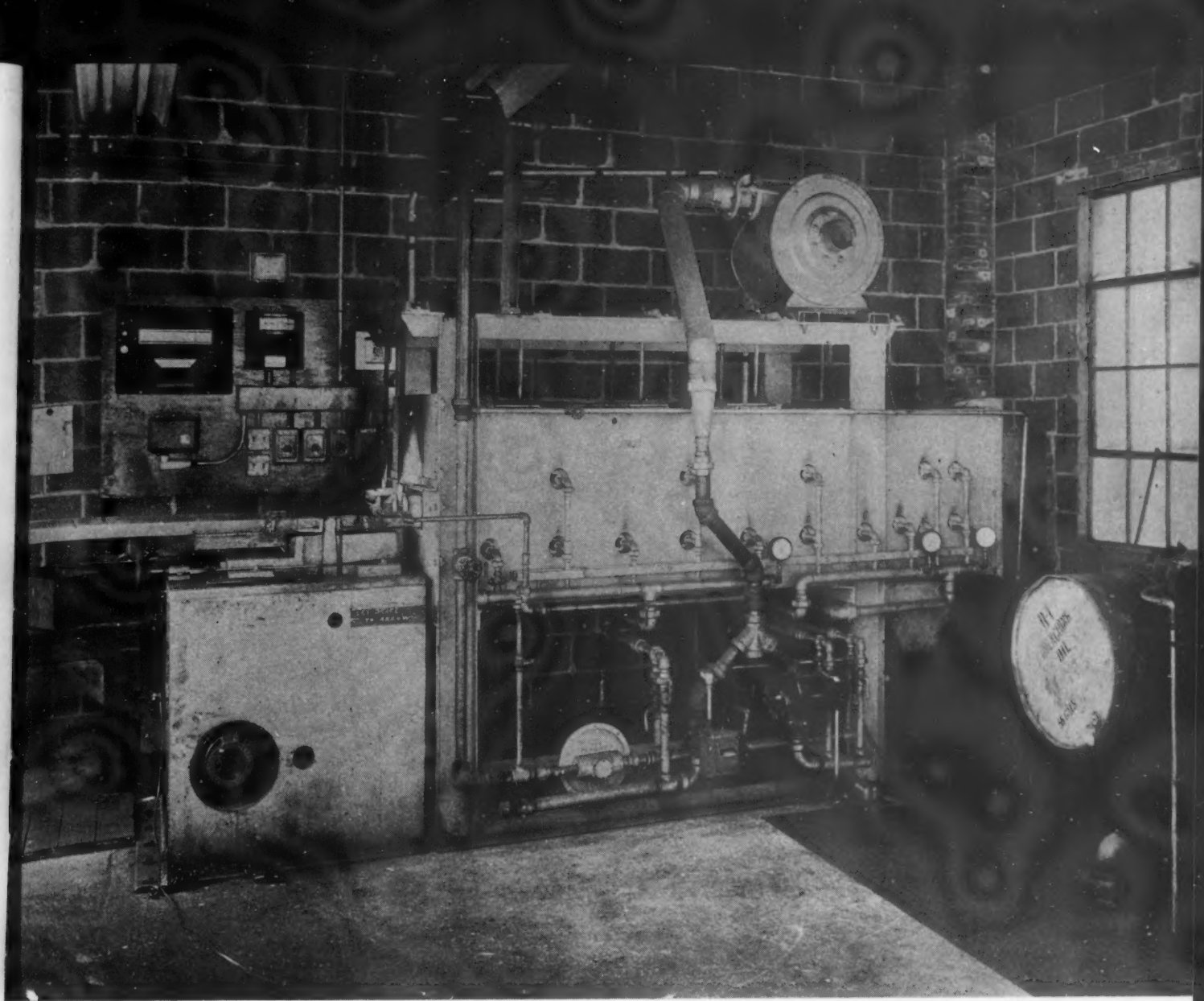
The Landmaco Threading Machine is a precision tool capable of handling your threading operations economically. It is geared for high threading speeds with resultant maximum production.

Its many exclusive features assure the greatest possible degree of accuracy, ease of operation and flexibility in making set-up changes.

Write for Bulletin No. H-75

LANDIS MACHINE COMPANY, WAYNESBORO, PENNA, U.S.A.

THREAD CUTTING MACHINES • DIE HEADS • COLLAPSIBLE TAPS • THREAD GRINDERS



Reciprocating Heating Machine in the Plant of Well-Known Hardware Manufacturer.

VERSATILE RECIPROCATING HEATING MACHINES SUITED TO WIDE VARIETY OF PROCESSES AND PRODUCTS

VERSATILITY is an outstanding characteristic of A.G.F. Reciprocating Heating Machines, which are suited to continuous clean hardening, annealing, normalizing, case-hardening by the patented Ni-Carb process, and many other types of work.

AMONG USERS are manufacturers of bearings, screws, lock washers, tools, wrenches, flat and coil springs, steel writing pens, and many others. Commercial heat treaters especially favor Reciprocating Heating Machines because these machines are able to handle the many varied and different jobs daily received in a general heat-treating shop.

VISIT A.G.F.
AT THE
METAL SHOW
(American Gas Association Exhibit)

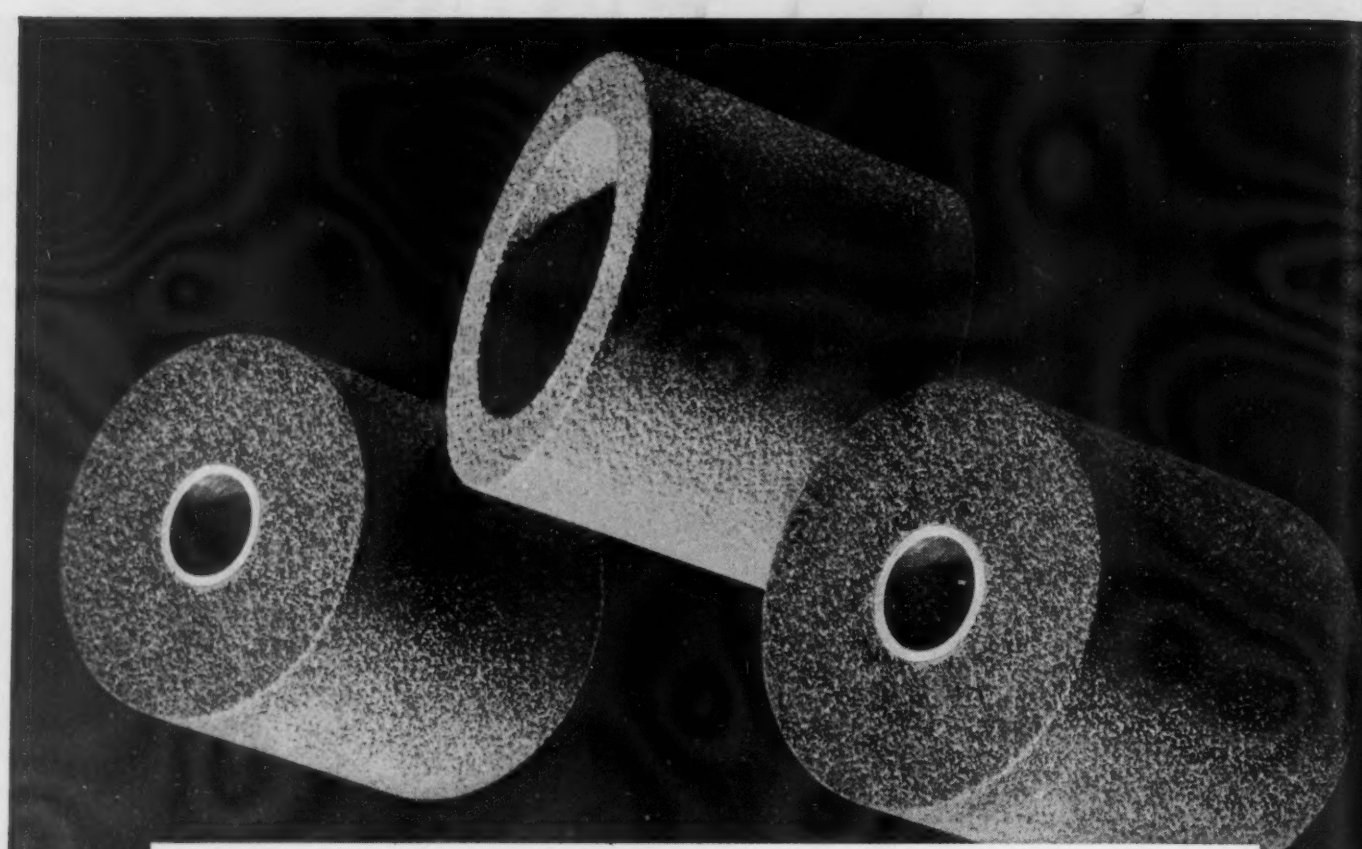
THE RECIPROCATING MUFFLE advances work through the heat by its own momentum. The complete elimination of conveying mechanism from the heating chamber reduces maintenance problems and heat losses to a minimum. There is no traveling belt to be alternately heated and cooled—only work enters and leaves the machine.

MANUFACTURED IN FIVE SIZES, Reciprocating Heating Machines have capacities ranging from 10 to 1200 pounds of work per hour. Write for detailed literature on these machines and other types of heat-treating equipment.

AMERICAN GAS FURNACE CO.

Elizabeth. New Jersey

AMERICAN PIONEERS 1878 FURNACE



Got 24 seconds to consider grinding?

Would you care to say right now that it is impossible to reduce your grinding costs?

If for any reason you doubt you could make that statement stick, we suggest a complete analysis of your grinding operations. Top production speed and low costs occur only when you use the correct wheels and machines for your particular work.

Call in Peninsular engineers. They will completely study your machines, your grinding methods, the metals you grind. From their findings, they will develop grinding wheels that get the kind of results you want.

Peninsular job-designed wheels can save money for you. *Every* Peninsular grinding wheel is specially made for its particular job.

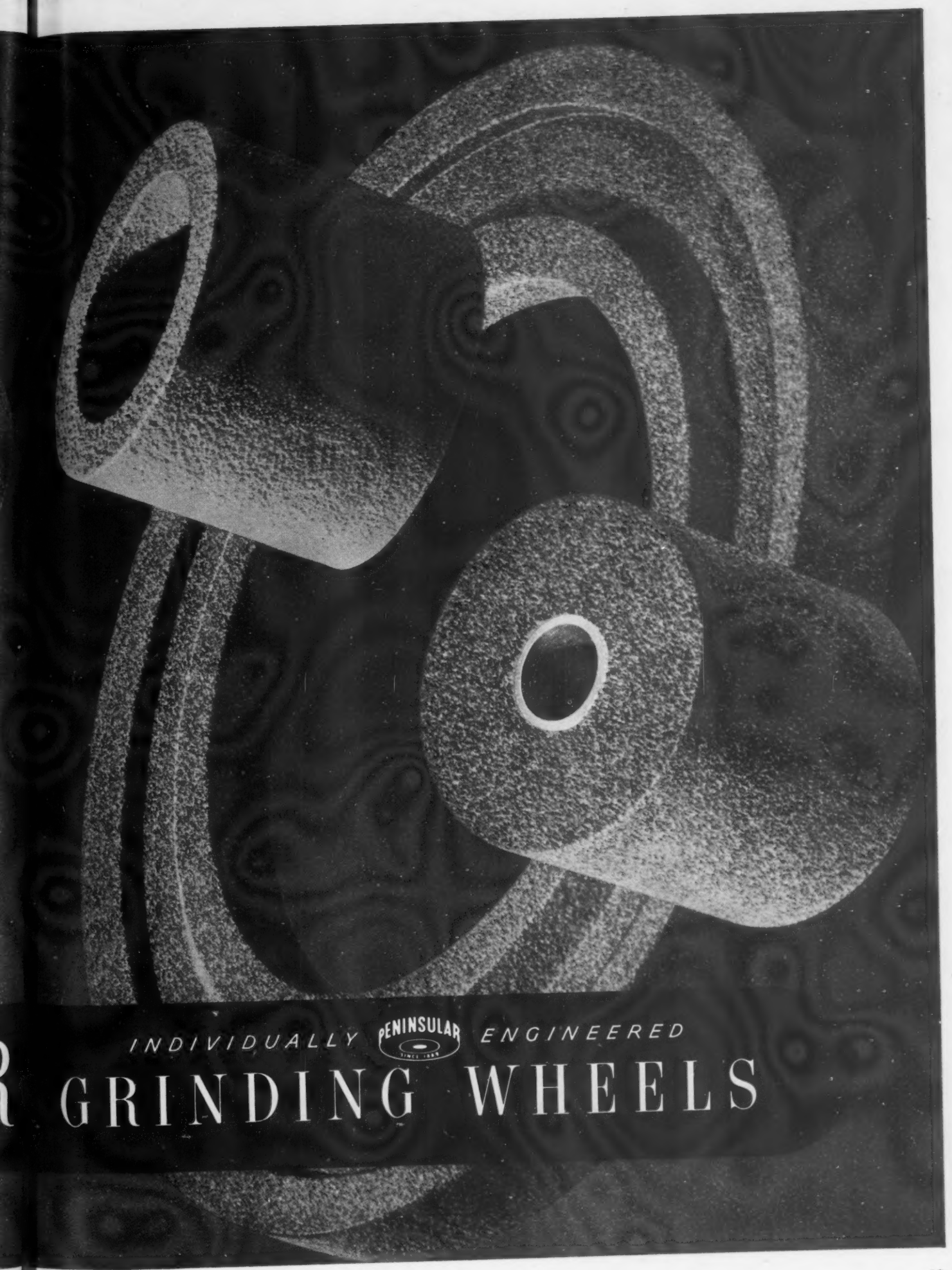
The Peninsular Grinding Wheel Co., 729 Meldrum Ave., Detroit 7. *Sales Offices:* Chicago, Philadelphia, Boston, Buffalo, Cleveland, Newark, Pittsburgh, Houston, St. Louis, Cincinnati.

(End of 24 seconds reading time.)

PENINSULAR

SINCE 1889

SPECIALISTS IN RESINOID BONDED WHEELS


INDIVIDUALLY PENINSULAR ENGINEERED
GRINDING WHEELS

a New UNITED 250 TON PERFORATING PRESS

- Compact, All-Steel Construction
- Centralized Lubrication
- Easily Accessible for Die Changing

This 250 Ton Mechanical Sheet Perforating Press is arranged to punch out a wide variety of perforations one-eighth of an inch to one and one-half inches in diameter in sheets up to 55 inches in width, and also special shape and grill-work punching, the number of holes of a given size being proportional to the thickness and physical characteristics of the material to be perforated.

The punch is motor crank operated through entirely enclosed drive with D.C. Ward-Leonard control to give speeds of 30 to 120 strokes per minute. The motor is provided with a start and stop single stroke, continuous running and inching control for adjustment of the punches and dies.

Material is fed into and out of the press by pinch rolls, located on the entry and delivery sides, actuated by an inching clutch and variable stroke crank to give a variable feeding stroke of 0" to 3". Feeding mechanism is mechanically synchronized with the operation of the punch.

UNITED ENGINEERING AND FOUNDRY COMPANY

PITTSBURGH, PENNSYLVANIA

Plants at PITTSBURGH · VANDERGRIFT · NEW CASTLE · YOUNGSTOWN · CANTON

Subsidiary: Adamson United Company, Akron, Ohio

Affiliates: Davy and United Engineering Company, Ltd., Sheffield, England

Dominion Engineering Works, Ltd., Montreal, P. Q., Canada

★ *The World's Largest Designers and Makers of Rolls and Rolling Mill Equipment*

For

HIGHLY SATISFACTORY WELDS OF THIN GAUGE METAL USE *the* CHAMPION

EXCELLENTLY adapted to thin gauge metal, ***GRAYDAC*** Electrode provides just sufficient penetration to make a good bond which allows for grinding flush without weakening the weld. On vertical down the bead is flat and exceptionally smooth. Spatter is held to a minimum and slag easy to remove.

Competitive tests showed ***GRAYDAC*** superior in bead appearance, penetration, ease of starting, vertical performance and all 'round handling. ***GRAYDAC*** is especially recommended for use with the low input type of Transformer Welding Machine.

NEW GRAYDAC ELECTRODE

AWS E-6013

{Above} Full view of portable machine bases and close up view of corner weld made with ***CHAMPION GRAYDAC Electrodes.***

{Above} Full view of bases for meat cutting machines and close up of corner weld made with ***CHAMPION GRAYDAC Electrodes.***

JOIN The AMERICAN WELDING SOCIETY

APPLICATIONS

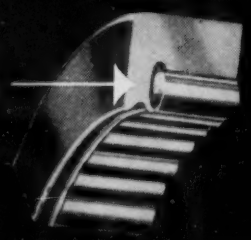
Auto Body Panels	Sheet Metal Work
Farm Equipment	Air Conditioning Equipment
Cans	Bus Bodies
Machine Parts	Fender Repairs

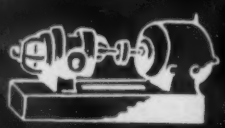
THE CHAMPION RIVET COMPANY

CLEVELAND, OHIO — **EAST CHICAGO, IND.**

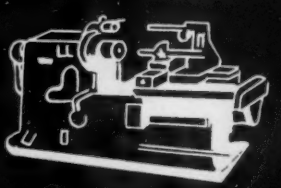
McGILL

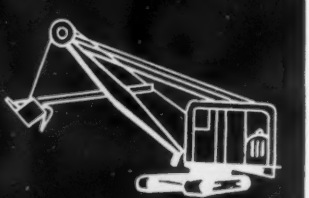
SOLIDEND MULTIROL Bearings





Designed as a self-contained unit, with races and rollers made from through-hardened high-carbon chrome steel, there are no loose parts to warp or break. The solidend shoulder construction and retaining lip, built integral with the outer race, hold the rollers, eliminating any possibility of the bearing coming apart during installation or operation. Rounded end, full length rollers give greater load carrying capacity, and close tolerance in construction, increases the overall efficiency. Where it is necessary to conserve radial space the bearing can be used without the inner race and the bearing mounted directly on the shaft. Provision for incidental thrust is provided along with adequate lubrication facilities. Write for Bulletin SM-42. If you have a special bearing problem McGill engineers will be glad to cooperate in working out a bearing to fit.

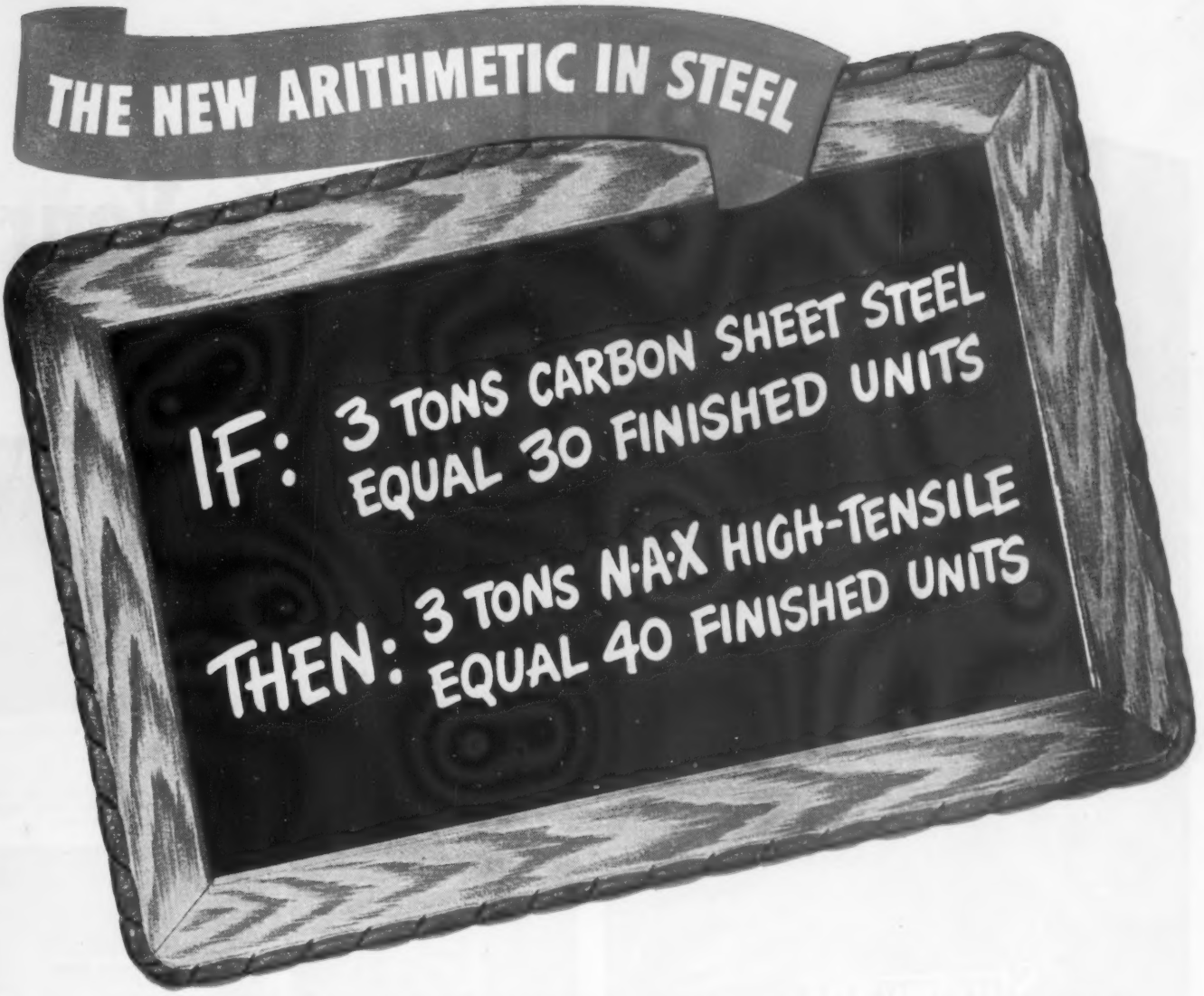




FOR ALL TYPES OF INDUSTRIAL EQUIPMENT

McGILL MANUFACTURING CO., INC.

MANUFACTURERS OF BALL AND ROLLER BEARINGS — VALPARAISO, INDIANA


THE NEW ARITHMETIC IN STEEL
IF: 3 TONS CARBON SHEET STEEL EQUAL 30 FINISHED UNITS
THEN: 3 TONS N·A·X HIGH-TENSILE EQUAL 40 FINISHED UNITS

A DEMONSTRABLE FACT: MANY USERS OF HOT AND COLD ROLLED SHEETS CAN INCREASE PRODUCTION OF UNITS 33% BY MAKING 3 TONS OF STEEL DO THE WORK OF 4

These days, the many production advantages of N-A-X HIGH-TENSILE steel are more important and more apparent than ever before.

With this low-alloy, high-tensile steel, you can use lighter sections . . . lighter, but of *equal* strength and *greater* durability. Lighter sections mean less steel per unit, more units per ton. Production of four units for every three units normally produced is a typical result.

Good formability permits N-A-X HIGH-TENSILE to be deep-drawn and formed to intricate shapes. At the same time, its greater corrosion-resistance, excellent weldability, high fatigue-resistance and great impact toughness bring both product improvements and production savings. Many fabricating, finishing and handling operations are simplified or eliminated.

The specific production increases and economies that can be effected in your plant through the use of N-A-X HIGH-TENSILE steel can be determined, of course, only by a study of your particular problems. Our metallurgists and engineers are at your service.

MAKE A TON OF SHEET STEEL GO FARTHER
Specify—
N-A-X
HIGH-TENSILE STEEL

GREAT LAKES STEEL
Corporation

N-A-X ALLOY DIVISION • DETROIT 18, MICHIGAN
UNIT OF NATIONAL STEEL CORPORATION

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GREAT LAKES STEEL CORP.

WHAT WE MAKE

Sturtevant
Puts Air to Work

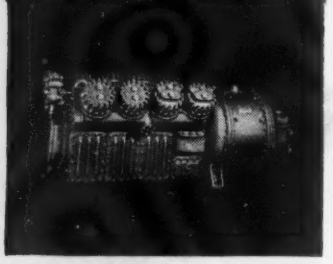
B. F. STURTEVANT COMPANY · DIVISION OF
Westinghouse Electric

Here's Your

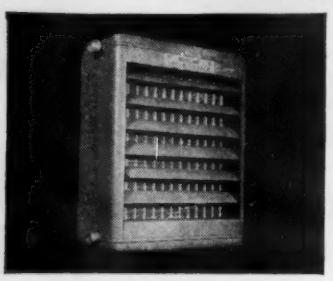
AIR-MOVING

The **SILENTVANE FAN** is one of the most versatile of all air-moving units—performing thousands of jobs in heating, ventilating, and mechanical-draft applications. Available in 19 sizes, this is just one of the many types of blower and exhaust fans listed.

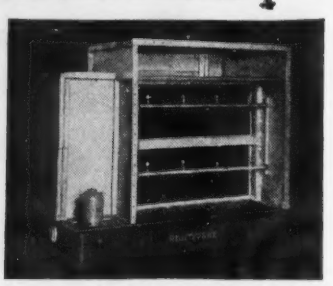
AIR-CONDITIONING



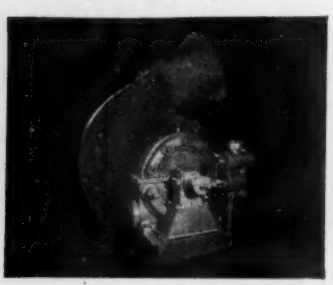
HERMETICALLY-SEALED COMPRESSOR—heart of the air-conditioning system—is designed to save power and prevent refrigerant losses, with completely sealed-in construction and direct motor drive. No shaft seals, belts, pulleys or couplings.



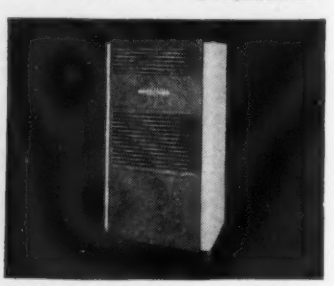
The **SPEED HEATER**—a compact, efficient unit providing fast, economical heat—is typical of Sturtevant's complete line of space heaters for commercial and industrial applications. Whatever your needs, you'll find a Sturtevant unit for the job.



The **SURFACE DEHUMIDIFIER**—another vital component—maintains just the right amount of moisture for comfort or industrial air conditioning. These precision-engineered units are available in 47 standard sizes, to meet every conditioning requirement.



DESIGN 14 CENTRIFUGAL COMPRESSOR provides a dependable source of high-pressure air for pneumatic conveying, furnace blowing, and many other industrial applications. There is a Sturtevant centrifugal compressor to meet your every requirement.

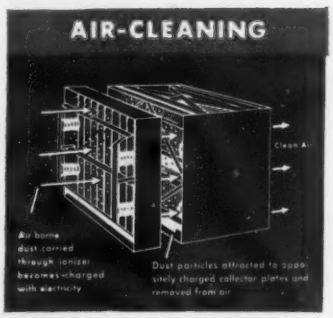


WITHIN-THE-SPACE TYPE UNITAIRE is a compact, self-contained air-conditioning unit—complete with all components and ready for connection to water supply and electric power. Central Plant Type Unitaires also available.

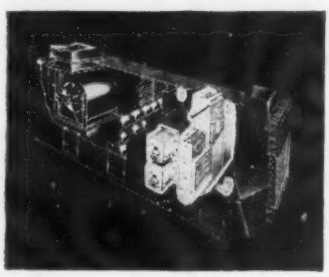
HEATING · VENTILATING · AIR CONDITIONING ·

DRYING · DUST AND FUME CONTROL · CONVEYING

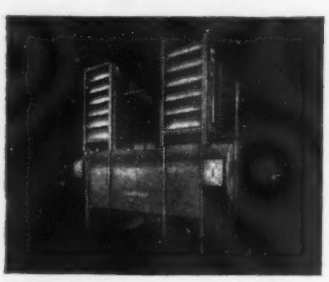
Complete Air-Guide for 1947!


AIR-CLEANING
Clean Air
Air borne dust carried through ionizer becomes charged with electricity
Dust particles attracted to oppositely charged collector plates and removed from air

WESTINGHOUSE PRECIPITRON,* the electronic air cleaner. Here's how it works: as air passes through the unit, every particle of dust and dirt is first given an electrical charge, then attracted to oppositely-charged plates and removed from the air.



INSTALLED IN A CENTRAL PLANT air-conditioning system, the Precipitron provides a continuous supply of thoroughly-cleaned air, for distribution to all parts of a building. Collected dirt is removed by flushing the plates, manually or automatically.



INDUCED-DRAFT FLY-ASH COLLECTOR —for low-cost separation and collection of flue dust—shows the kind of equipment available for mechanical-draft air-cleaning applications. Separate cyclone and cellular-type dust collectors are also available.

**Trademark registered in U.S.A.*

The New Sturtevant-Westinghouse Catalog gives you up-to-the-minute answers on all three types of air-working equipment . . . all in one convenient, pocket-size volume

NEVER BEFORE have you been offered so *complete* a book as this! One that contains factual information on the *three* basic types of equipment—for air moving, air cleaning *and* air conditioning.

For when Sturtevant became a division of Westinghouse Electric, it was the first time that all three types of equipment were available from a single manufacturing source. And today, the complete line is included in this convenient, pocket-size volume—the 1947 edition of "What We Make," which is yours for the asking.

HELPS YOU DESIGN...SPECIFY...AND ORDER...FROM THE MOST COMPLETE LINE EVER AVAILABLE FROM A SINGLE MANUFACTURING SOURCE

The new catalog contains 211 pages of concise, condensed information—divided, for easy reference, into the following subjects:

82 Pages of Equipment. Listings, data, and description that will help you select the equipment best suited for any job.

37 Pages of Applications. Photos and facts that show how air is being used profitably in all branches of industry—and how it can work for you.

80 Pages of Engineering. Valuable, authoritative, air-engineering data, tables, formulas, and simplified charts that will help solve your design problems.

A request on your business letterhead brings your copy by return mail. B. F. Sturtevant Company, Division of Westinghouse Electric, Hyde Park, Boston 36, Mass., c/o Dept. S.

3681-50

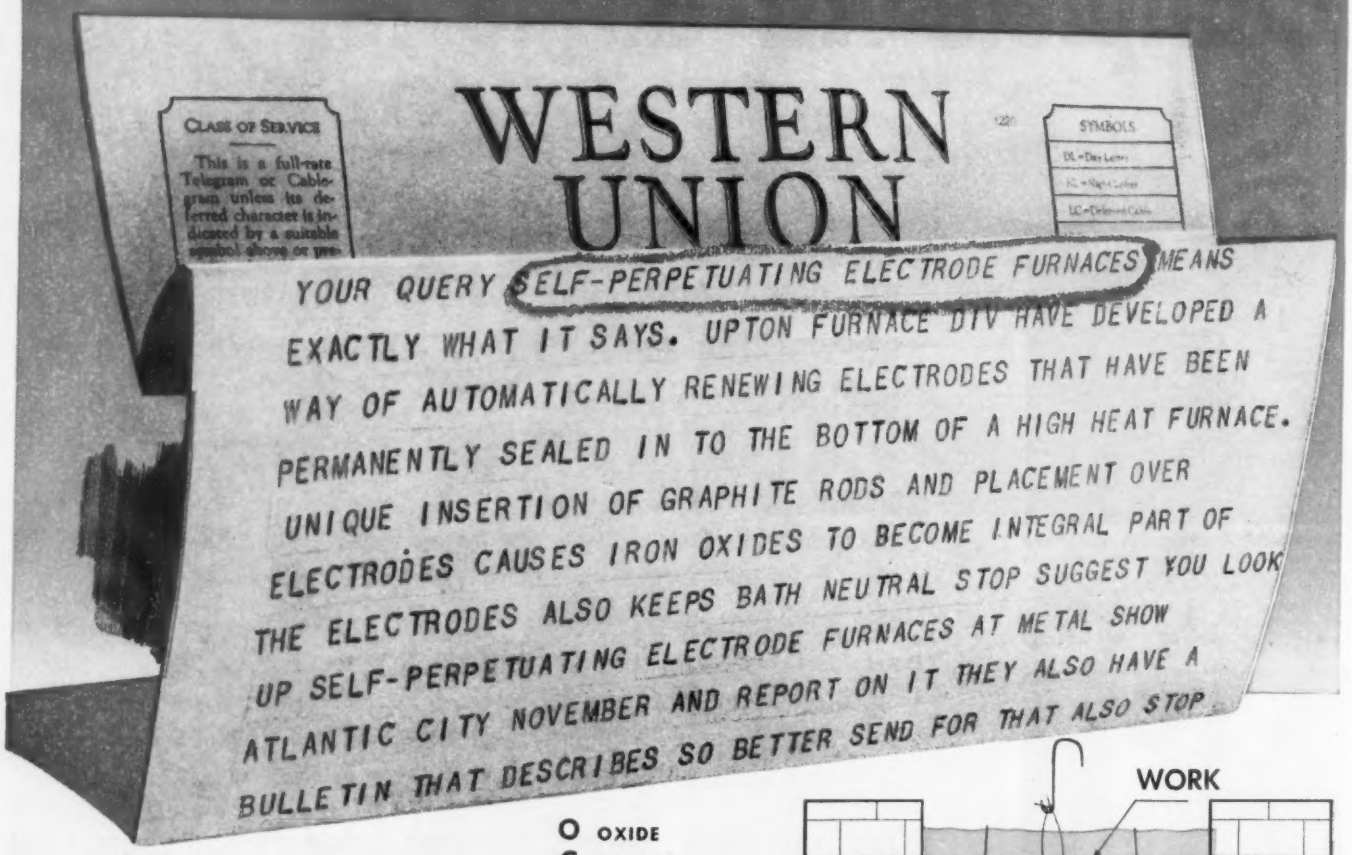
Sturtevant
Puts Air to Work

B. F. STURTEVANT COMPANY • DIVISION OF
Westinghouse
ELECTRIC

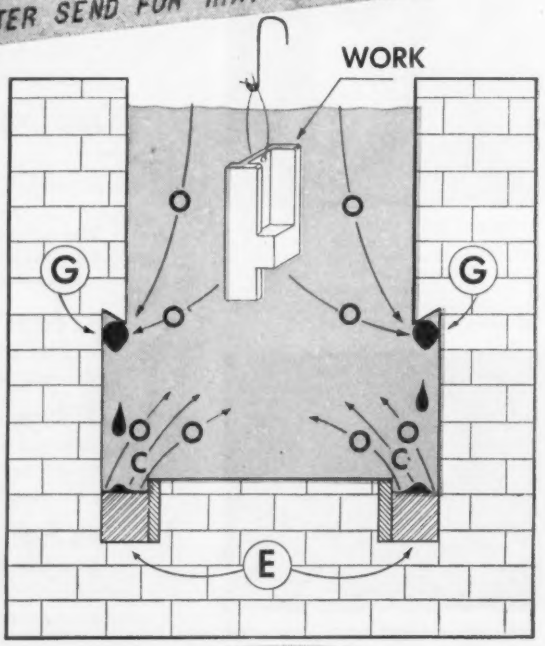
PRECIPITRON
MECHANICAL DRAFT

Announcing the NEW

SELF-PERPETUATING ELECTRODE FURNACES


CLASS OF SERVICE
This is a full-rate Telegram or Cablegram unless its deferred character is indicated by a suitable symbol above or pre-
WESTERN UNION
SYMBOLS
YOUR QUERY SELF-PERPETUATING ELECTRODE FURNACES MEANS
EXACTLY WHAT IT SAYS. UPTON FURNACE DIV HAVE DEVELOPED A
WAY OF AUTOMATICALLY RENEWING ELECTRODES THAT HAVE BEEN
PERMANENTLY SEALED IN TO THE BOTTOM OF A HIGH HEAT FURNACE.
UNIQUE INSERTION OF GRAPHITE RODS AND PLACEMENT OVER
ELECTRODES CAUSES IRON OXIDES TO BECOME INTEGRAL PART OF
THE ELECTRODES ALSO KEEPS BATH NEUTRAL STOP SUGGEST YOU LOOK
UP SELF-PERPETUATING ELECTRODE FURNACES AT METAL SHOW
ATLANTIC CITY NOVEMBER AND REPORT ON IT THEY ALSO HAVE A
BULLETIN THAT DESCRIBES SO BETTER SEND FOR THAT ALSO STOP

O OXIDE
C CARBON
E ELECTRODE
G GRAPHITE ROD



Oxides form in the bath, from contact with the atmosphere at the surface, from the work, and from absorption of oxygen from electrodes.

1. Electrodes give up oxygen, waste away.
2. Oxides circulating through bath contact graphite rod.
3. Oxides are reduced to metallic state in contact with graphite rod.
4. Increased carbon content reduces melting point of oxide.

Oxide droplets form, fall on electrode. Droplets begin giving up carbon, harden on electrodes, become integral part of electrode.

Ask for complete information on this process and its use in your heat treating.

See us at Booth E-204 at the Metal Show. Atlantic City Nov. 18-22

Upton ELECTRIC FURNACE DIV.

7455 MELVILLE AT GREEN • DETROIT 17, MICHIGAN

This New Trend in DYNETRIC* BALANCING

CUTS HANDLING COSTS TOO!

● Handling is a cost item to reckon with wherever you find it.

Here is one of the ways Gisholt is solving this problem in the Dynetric Balancing of many parts—as well as in the balancing of complete assemblies.

This Gisholt 3S Dynetric Machine is built complete with drilling equipment as an integral part of the machine, for making necessary corrections in both flywheel and crankshaft. The job illustrated, an assembly of two-throw crankshaft and flywheel, is heavy and awkward to handle. By making it possible to *measure* unbalance, to *correct* it, and to *check accuracy* with a single loading of these parts on the machine, two-thirds of the former handling time is saved. Two loadings and unloadings are eliminated. The saving in time and cost is obvious.

Here, perhaps, is an idea that can be applied to your balancing problems. Why not find out, and take advantage of the cost reductions as soon as possible? Write us for complete information.

**Developed jointly with the Westinghouse Electric Corp.*

GISHOLT MACHINE COMPANY

1217 E. Washington Ave., Madison 3, Wis.

GISHOLT

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

Look Ahead...
Keep Ahead...
with Gisholt

Needle Bearings can Boost Production, too!

One good way to give your production a lift is to simplify design problems and assembly operations through the use of Torrington Needle Bearings.

The compact unit construction of these modern anti-friction bearings speeds progress at every stage . . . from design to final installation. Needle Bearings require only a bore machined to proper dimensions for the housing . . . installation is a simple press fit operation . . . no retainers or spacers are necessary to hold them in position. Thus, there are fewer production and assembly steps, fewer parts to handle and control when Needle Bearings are employed.

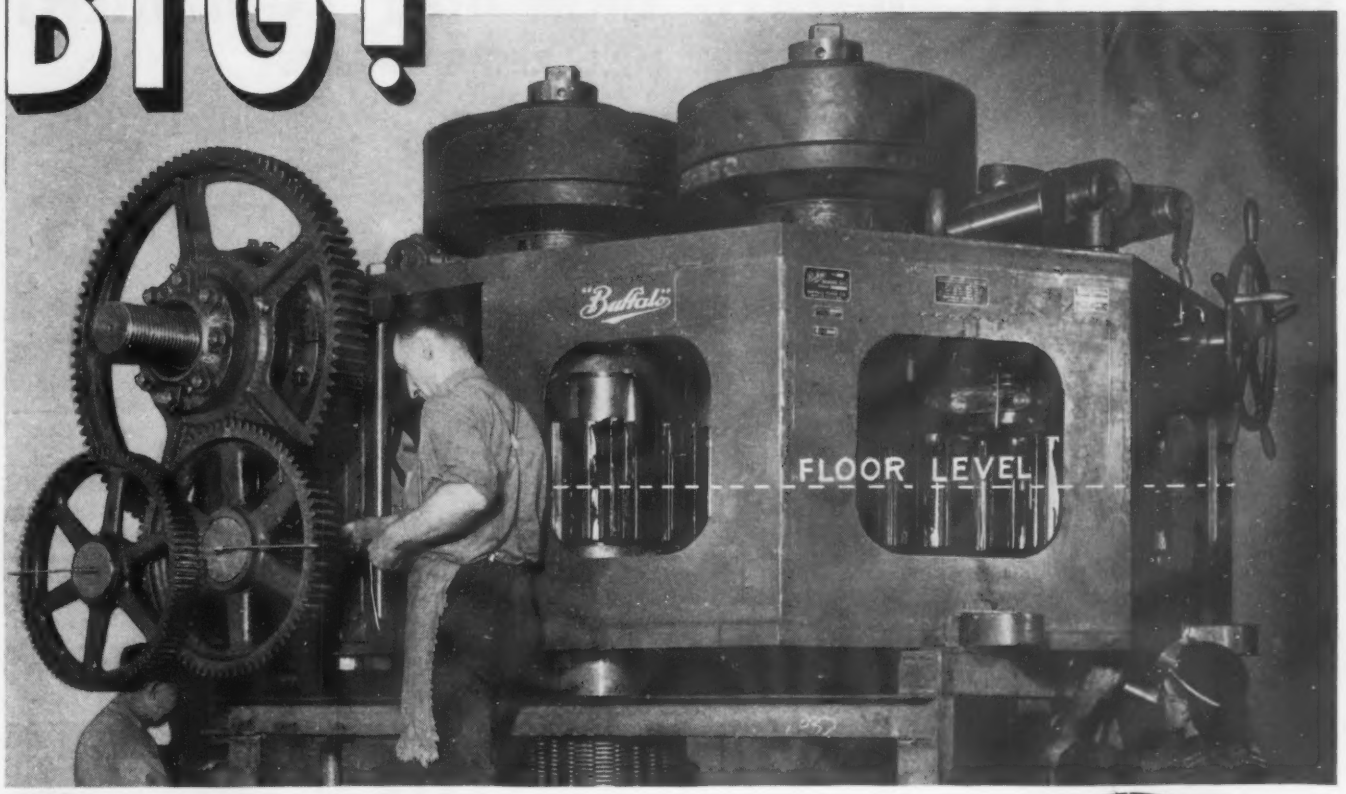
Torrington Needle Bearings also help to improve product performance. Their high radial capacity and compact design saves space and weight, and their efficient lubrication means better operation, less maintenance, and less time out for servicing or overhauling. So, production is aided in this way too—by keeping tools, machinery and handling equipment on the job.

Let our engineering department show how you can boost *both your production and your product's efficiency* through these and other Needle Bearing advantages. Write for our informative Catalog No. 32.

THE TORRINGTON COMPANY
TORRINGTON, CONN. SOUTH BEND 21, IND.
Offices in All Principal Cities

TORRINGTON NEEDLE BEARINGS

BIG!

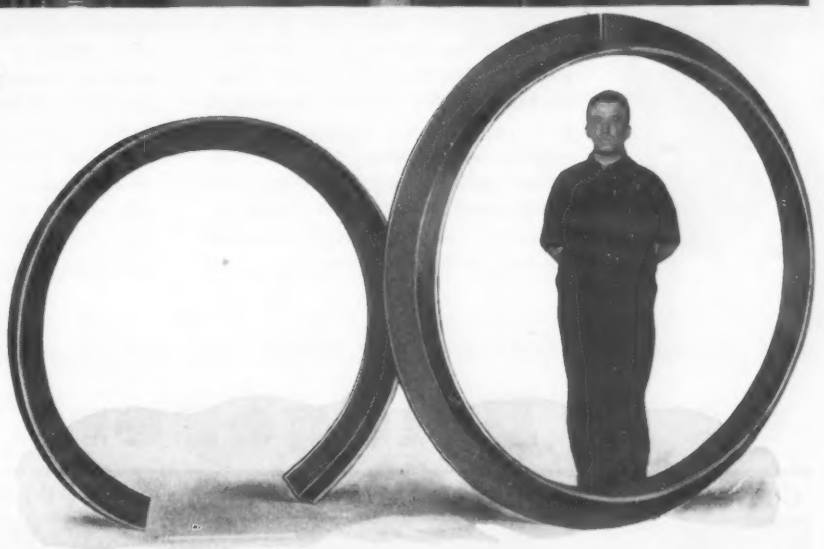


AND SO IS ITS *Turnout!*

From the photo above, you can see at a glance how rugged is the construction of "Buffalo" Horizontal Bending Rolls. They are built to *hold their accuracy* in the cold-rolling of tees, channels, angles, rounds and other shapes over long, trouble-free years.

Even inexperienced operators can account for an amazing amount of work in a day with "Buffalo" Bending Rolls . . . a big factor in cutting turnout costs.

If you bend metal, why not write us, telling your diameters and what you bend? We'll be glad to give you full particulars on MORE ECONOMICAL BENDING!



"WITH THE GREATEST OF EASE"

LEG-IN JOBS such as these can be rolled out, thanks to the patented "Buffalo" leg-in attachment. 108" circles are commonplace accomplishments in many "Buffalo" installations.

BUFFALO FORGE COMPANY

158 Mortimer St. **Buffalo, N. Y.**

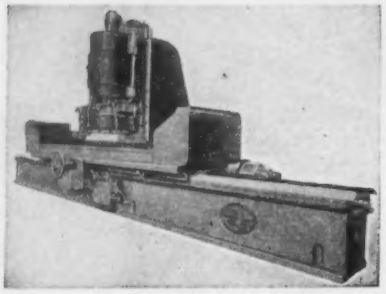
Canadian Blower and Forge Co., Ltd., Kitchener, Ont.

"Buffalo" BENDING ROLLS

LOOK TO "BRIDGEPORT" FOR

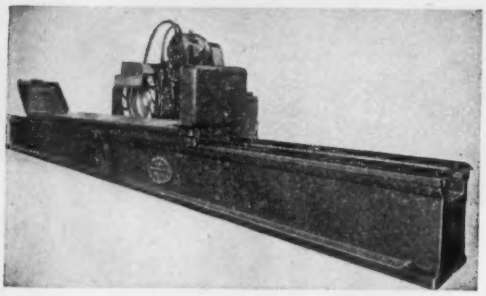
UP TO THE MINUTE GRINDING EQUIPMENT

FOR ALL STEEL MILL REQUIREMENTS



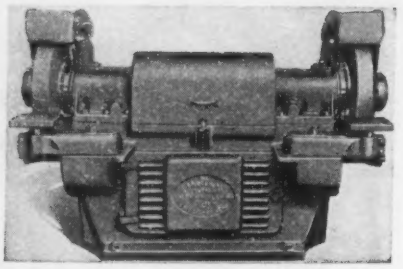
No. 103
VERTICAL SURFACE GRINDER

A complete line of vertical surface grinding machinery to meet every metal finishing requirement. Massive construction, large table capacity, hydraulic operation, automatic wheel feed controls, and central control of all operations, make this a highly efficient machine for production grinding of flat surfaces.



No. 85
HORIZONTAL FACE GRINDER

Increased production at lower costs is the outstanding feature of Bridgeport Face Grinders. A complete line of seven machines for all grinding needs, with table capacities up to 210" x 54". Massive Timken spindle bearings continuously lubricated, and table speeds of 5 to 170 ft. per minute, help to give these machines versatility.



No. 161
FLOOR STAND GRINDER

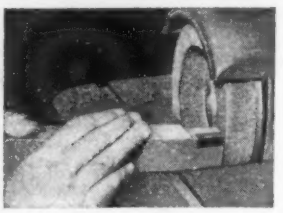
In sizes from 1 to 15 H. P. to fit all needs. Minimum floor space requirements, carbon steel spindles and large bearings running in oil, explain the popularity of Bridgeport Grinders. Supplied with variable speeds if desired. Other sizes and types of Floor Stand Grinders available.

No. 47W
ABRASIVE CUT-OFF MACHINE

Experience has demonstrated that abrasive wheels cut faster, cooler and cheaper than any other method. The Bridgeport line is complete, including standard machines with capacity up to 3½" on tubing and 2½" on solids; hydraulic semi-automatic machines for larger requirements and rotary cut-off machines for high production cutting.

"BUXITE"

Newest grinding wheel development—gives wheels a "case hardening" that compares favorably with diamond wheel life, and at a fraction of the cost! Grinds sintered carbide tools and other superhard materials with rapidity and wear resistance never before attained with abrasive wheels. Buxite will enable you to recondition all your tools in your own shop.

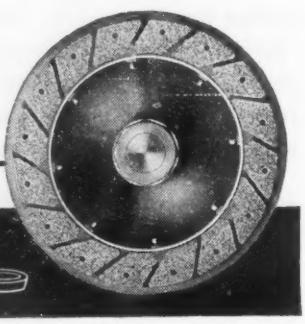


The standard line of "Bridgeport" Grinding Wheels includes all Alumina and Silexon wheels with vitrified, silicate and resinoid bonds—sizes 4" to 30."

THE BRIDGEPORT SAFETY EMERY WHEEL CO., INC., Bridgeport, Conn., U.S.A.

Bridgeport

GRINDERS • GRINDING WHEELS • BUFFING LATHES



DEALER REPRESENTATION

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G. C. Salomone,
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Washington Executive 5553

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Jacksonville 5-7970

SO. CAROLINA
Cameron & Barkley Co.,
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Charleston 7661

ILLINOIS
Bryant Machinery & Engineering Co., 400 West Madison St.,
Chicago Andover 4488

MASSACHUSETTS
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Statler Bldg., Boston
Hancock 6750

MICHIGAN
The E. E. Wood Machinery Co.,
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Detroit Madison 0132

MINNESOTA
Anderson Machine Tool Co.,
2645 University Ave.,
St. Paul
Nestor 6548

MISSOURI
Blackman & Nuetzel Machinery Co., 3713 Washington Ave.,
St. Louis
Neusted 0765

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New York City
The Rudel Machinery Co., Inc.,
100 E. 42nd St.,
Lexington 2-6220

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The R. E. Parry Co.,
412 Jackson Bldg., Buffalo
Cleveland 5084

OHIO
Cleveland
Mansco Sales Co.,
1900 Euclid Bldg.,
Cleveland Main 0968

Cincinnati
The Brokaw Machinery Co.,
The Alms Hotel
Cincinnati
Woodburn 5201

PENNSYLVANIA
Philadelphia
Edward A. Lynch Machinery Co., Times Medical Bldg.,
Ardmore 5485

Pittsburgh
Rees Machinery Co.,
1012 Empire Bldg.,
Pittsburgh Atlantic 8285

TEXAS
G. F. Cotter Supply Co.,
Union National Bank Bldg.,
Houston
Capitol 7521

FOREIGN, SOUTH AMERICA
Sabin St. Germain & Associates,
285 Madison Ave.,
New York City
Murray Hill 5-7920

EUROPE
The Engis Equipment Co.
431 So. Dearborn St.,
Chicago
Harrison 5176

YOUR steel requirements can best be served by a progressive, superbly staffed, completely integrated steel producer. WISCONSIN is exactly that.

Progressive is more than a word at WISCONSIN. It's a *fact* that has been demonstrated by our development of Sulfite-Treated Steel—the highly machinable steel that overcomes the faults of resulphurized steels. "H" steels of guaranteed hardenability are a specialty of ours. Both of these steels are earning wide acceptance and acclaim.

Superbly Staffed by top-flight steelmen, WISCONSIN has one prime objective: to make the best possible steel for our customers. Every man in the mill works toward that goal.

An Integrated Organization gives WISCONSIN complete control of the product from the ore mines to the customer. That control means finer steel.

Watch WISCONSIN for steel progress. We can't supply all the steel our customers need but the picture is improving. We haven't compromised with quality. Our sales and metallurgical staffs are ready to serve you.

WISCONSIN STEEL OPERATIONS

Ore Mines • Coal Mines • Ore Freighters
Blast Furnaces • Open Hearth Furnaces • Rolling Mills
Heat-Treating, Cold Finishing and Annealing Facilities

WISCONSIN STEEL COMPANY
(Affiliate of International Harvester Company)
180 North Michigan Avenue **Chicago 1, Illinois**

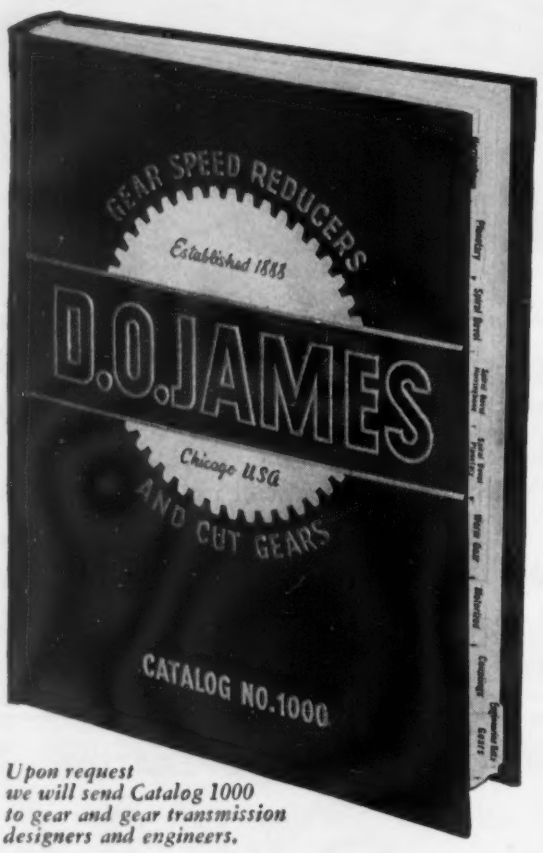
WISCONSIN STEEL

MAKERS OF EVERY TYPE OF GEAR AND GEAR SPEED REDUCER

D.O.James

Established 1888

CATALOG NO. 1000 — *It's new and complete . . . and contains the latest information available...* On the Engineering and Manufacture of Gears and Gear Reducers, Racks and Flexible Couplings



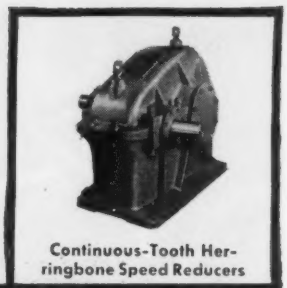
Upon request we will send Catalog 1000 to gear and gear transmission designers and engineers.

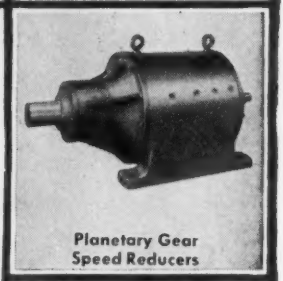
This 575 page indexed catalog contains essential practical information that will assist in solving gear and gear transmission problems. The contents of Catalog 1000 include extensive engineering data, rating tables, recommended practices for speed reducer selection, horsepower capacities of gears with examples, dimensions and list prices — also general information on design, construction and application of various types of cut gears, gear speed reducing transmissions and flexible couplings.

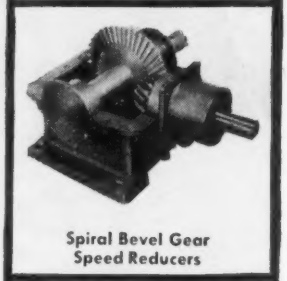
IMPORTANT ENGINEERING DATA

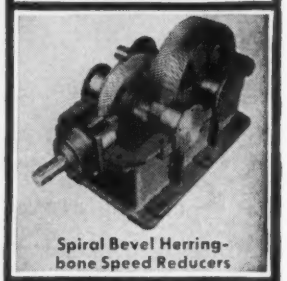
Catalog 1000 contains 100 pages of invaluable engineering data. This engineering section has been compiled and obtained from various accredited sources and includes tables, charts and formulas that have proven useful and helpful in gear design problems.

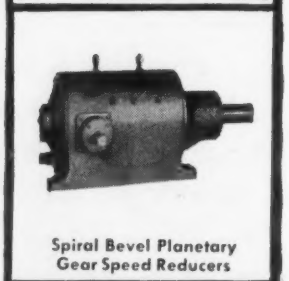
D.O.JAMES MANUFACTURING COMPANY
1140 WEST MONROE STREET • CHICAGO (7), ILLINOIS

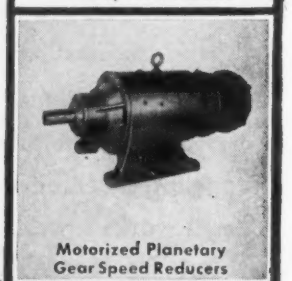

Continuous-Tooth Herringbone Speed Reducers

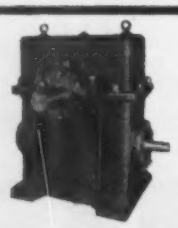

Planetary Gear Speed Reducers


Spiral Bevel Gear Speed Reducers

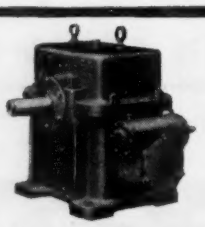

Spiral Bevel Herringbone Speed Reducers


Spiral Bevel Planetary Gear Speed Reducers


Motorized Planetary Gear Speed Reducers


Type "H" Worm Gear Speed Reducers

Helical Worm Gear Speed Reducers


Double Worm Gear Speed Reducers

Motorized Worm Gear Speed Reducers

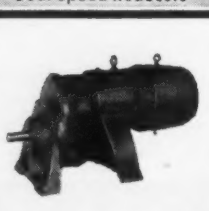

Motorized Helical Gear Speed Reducers

PHOTO COURTESY OF THE BETTMANN ARCHIVE

FROM A METAL-MASTER'S "FAMILY ALBUM"

When "Physical Labs" operated like this . . .

Quality Control was "STANDARD" practice

A strong long-handled wrench, a good spring balance, and a firm but delicate hand was the only equipment required in this "testing machine" of 1874. Yet even then, Standard Steel recognized the importance of quality control, and had sought metallurgical counsel from a leading chemist of the day, to solve a production problem.

Standard early recognized the importance of controlling production processes from the first stages, and in order to adequately supervise the all-important initial steps, installed an open hearth furnace in 1895. In recent years, extensive research on heat treatment has greatly increased the capacity of Standard forgings and castings to meet the demands of rigorous service.

To simplify purchasing and assure uniformly good quality, "Standardize on Standard" for your forgings and castings. The Baldwin Locomotive Works, Standard Steel Works Division, Burnham, Penna., U. S. A. Offices: Philadelphia, New York, Chicago, St. Louis, Washington, Boston, San Francisco, Cleveland, Detroit, Pittsburgh, Houston, Birmingham, Norfolk.

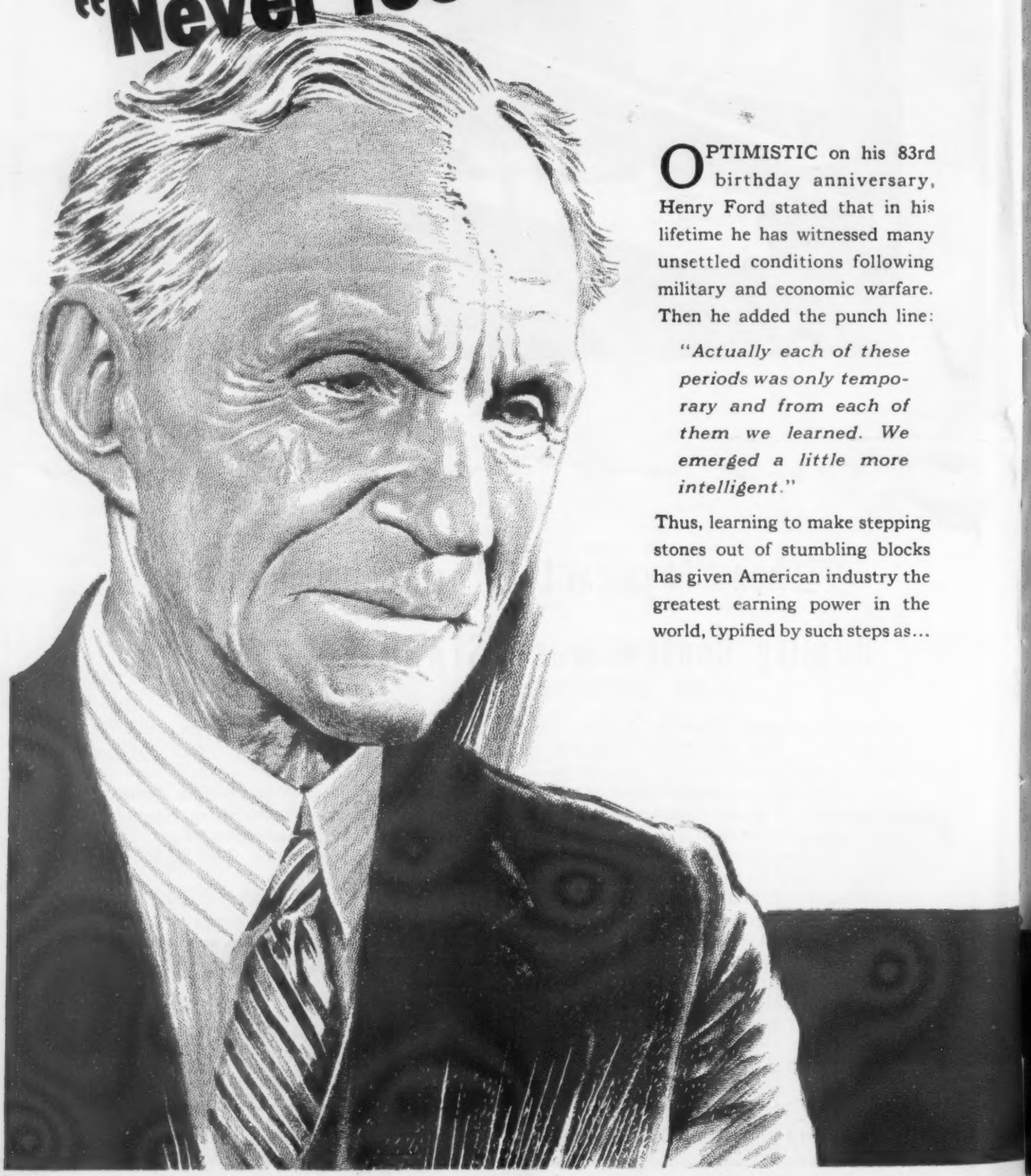
BLW THE BALDWIN GROUP **BALDWIN**

FORGINGS AND CASTINGS

"STANDARDIZE ON STANDARD" FOR YOUR FORGINGS AND CASTINGS

then he said to himself:

"Never too old to earn"



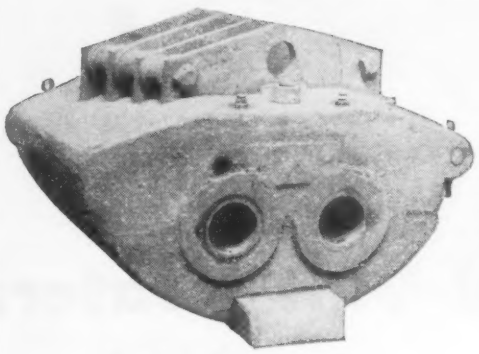
OPTIMISTIC on his 83rd birthday anniversary, Henry Ford stated that in his lifetime he has witnessed many unsettled conditions following military and economic warfare. Then he added the punch line:

> *"Actually each of these periods was only temporary and from each of them we learned. We emerged a little more intelligent."*

Thus, learning to make stepping stones out of stumbling blocks has given American industry the greatest earning power in the world, typified by such steps as...

Look, Mr. Ford, **what one enterprising manufacturer earned and what he learned in the designing of products:**

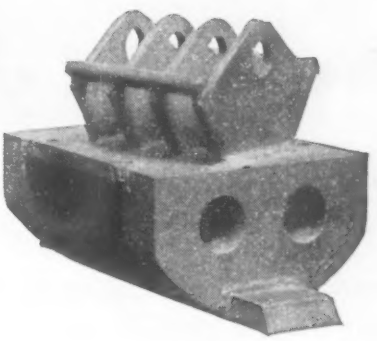
IMPROVE . . . IMPROVE . . . IMPROVE with Welded Design



FORMER DESIGN
COST $89.05*

1ST WELDED DESIGN
COST $91.36**

2ND WELDED DESIGN
COST $72.99**



* Includes counterweight. Cost does not include pattern development.

** Cost includes overhead and counterweights (not shown).

Courtesy Wellman Engineering Company, Cleveland, Ohio

A MANUFACTURER of clamshell buckets changed over a counterweight sheave block to welded design. Look what he *earned*. The first welded design cost about the same as the former design but helped absorb shop overhead and made production more flexible. BUT, look what he *learned:*

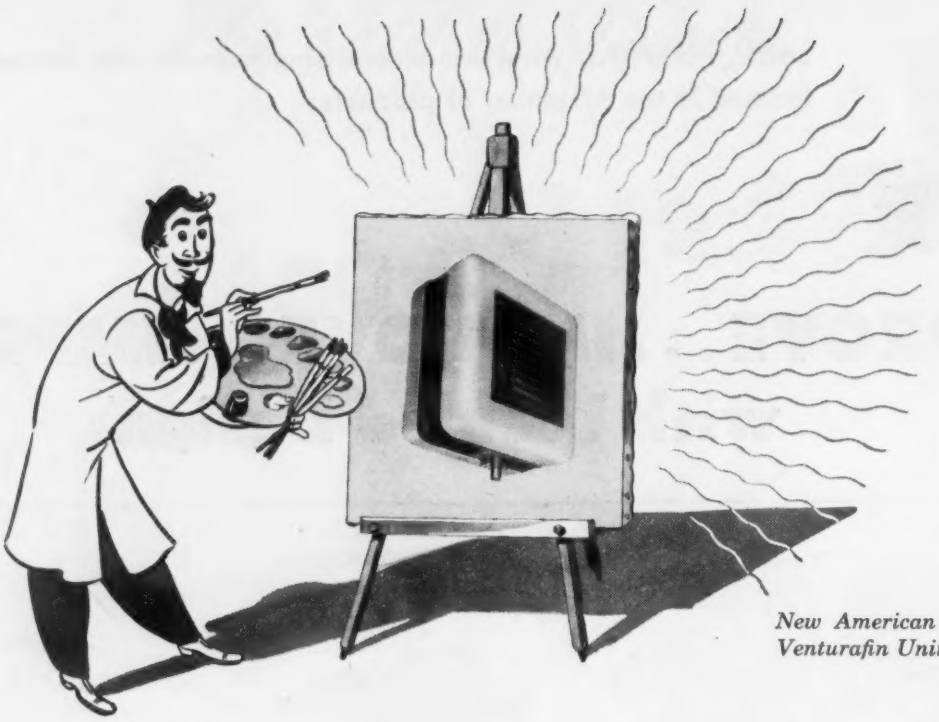
He learned: If the first welded design does not cut costs, it simply means that he does not have the correct answer. By continually thinking in terms of welded design, he can find a *better way at lower cost*. Each improvement becomes a stepping stone to further progress. His second welded sheave block cut the cost 20%.

The Lincoln Engineer nearby will gladly help you explore for similar earnings and learnings in your operations. Machine Design Studies free on request to engineers and designers.

THE LINCOLN ELECTRIC COMPANY • Dept. 29 • Cleveland 1, Ohio

America's greatest natural **recourse**

ARC WELDING



New American Blower Venturafin Unit Heater

We dolled up Industrial Unit Heaters!

For many years, industrial heating was both a "headache" and an "eyesore."

American Blower engineers cured the "headache" before the war by greatly increasing the range and efficiency of Unit Heaters, and eliminating needless noise in operation.

Now, we have greatly improved the appearance of industrial unit heaters—made them fit the architecture and environment of the most modern offices, factories, stores, garages, etc.

Phone your nearest American Blower Branch for information about the new, improved Unit Heaters for wall, floor or ceiling mounting. Ask also about any other air handling equipment you may require, and about Gyrol Fluid Drive for the smooth transmission of power or stepless variable speed control.

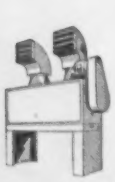
AMERICAN BLOWER

AMERICAN BLOWER

AMERICAN BLOWER CORP., DETROIT 32, MICH.

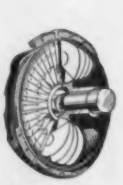
Division of American Radiator & Standard Sanitary Corporation

4 Years of War-Stimulated Improvement—On Top of 61 Years of Engineering Development

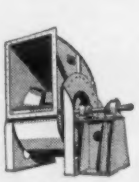


Heating Equipment

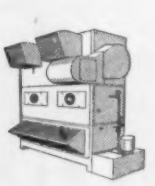
Ventilating Equipment



Gyrol Fluid Drive



Industrial Fans



Air Conditioners

Dust Collectors

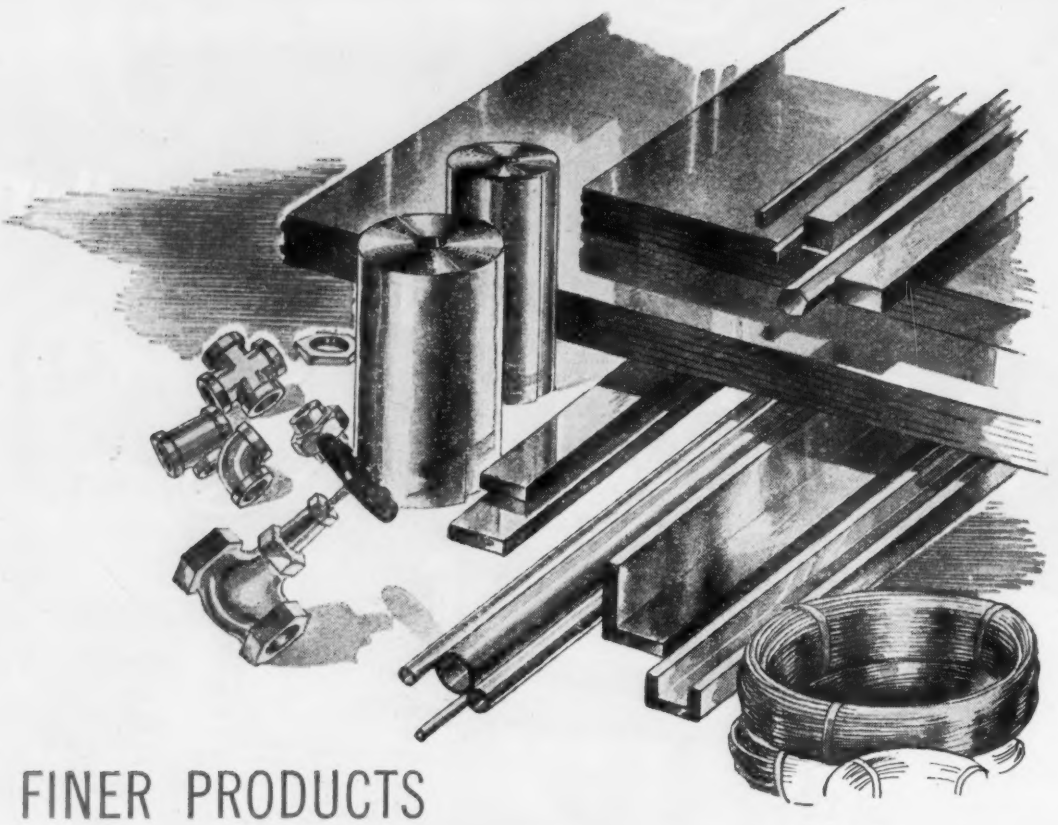
Not so many years ago, powder metallurgy lived mostly in the realm of pure research. It led a sheltered existence.

Moraine Products has taken the lead in moving powder metallurgy out of the laboratory and into the tough competitive field of production. Here it must stand on its own merits, pay its own way. And our experience has shown that the production of metal powder parts is *economical* only in large, continuing runs. Small, intermittent orders seldom justify the cost of tooling and setup.

That's why we say that the automatic counter is the heartbeat of powder metallurgy . . . and volume keeps it clicking. Metal powder parts from Moraine are being produced in the thousands and tens of thousands to give our customers a better product at less cost. When you have a large need for parts, fabricated to practical tolerances with a fine finish, let our engineers work with you.

MORAINE PRODUCTS DIVISION OF **GENERAL MOTORS**

DAYTON, OHIO



FOR FINER PRODUCTS

Stainless steel is available in many forms

When you are planning new equipment, you will find stainless steel available in a form to suit your purpose. Bars, sheets, strip, angles, tubing, wire, valves, and fittings are some of the many forms available. This metal, so hard to get during wartime, is now ready for use wherever strength, resistance to corrosion, or surface beauty are required. Stainless steel is readily fabricated into a variety of products from tableware to streamlined trains.

If you are interested in some of the new and varied uses of stainless and other alloy steels, ask to receive the monthly publication, ELECTROMET REVIEW. Or, if you need information on the production, properties, or fabrication of these steels, write our Technical Service Department. We do not make steel but we do produce the ferro-alloys which are used in its manufacture, and our engineers have accumulated a fund of information on the use of stainless steel in many industries.

ELECTRO METALLURGICAL COMPANY
Unit of Union Carbide and Carbon Corporation
UCC
30 East 42nd Street, New York 17, N. Y.
In Canada: Electro Metallurgical Company of Canada, Limited, Welland, Ontario

STAINLESS STEEL

BEAUTIFUL ENDURING STRONG TOUGH

Electric HEAT

...BETTER HEATING AT LOWER OVER-ALL COST

FURNACES AND ATMOSPHERE EQUIPMENT

ELECTRONIC HEATERS

CALROD HEATERS AND DEVICES

From the smallest, standard heater to the largest, specially designed "complete process" equipment for an entire heating operation—General Electric assures you of—

1. A wide range of performance-proved, top-calibre equipment—the result of 40 years of electric-heating research, design, and manufacture.

2. Extensive facilities for rendering valuable technical assistance and an expert, nationwide field engineering organization to assist you in your heating problems.

The following three pages contain a cross-section of the entire G-E heating line. For more specific information relating to your particular operations, just fill out the coupon on the last page. We shall be glad to furnish you with descriptive literature, to study your requirements, and to submit detailed recommendations.

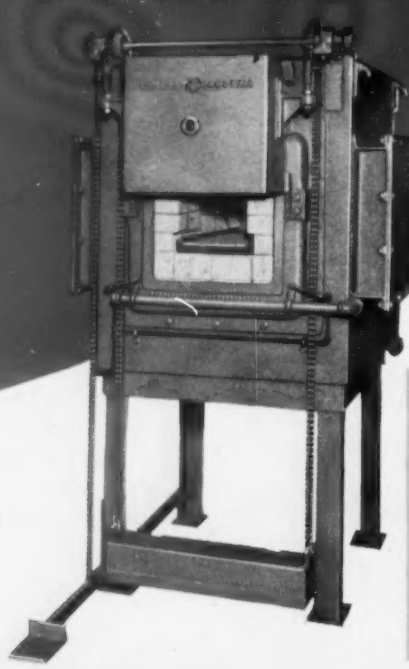
● *VISIT US AT THE NATIONAL METALS SHOW*

EQUIPMENT FOR ALL INDUSTRIAL PURPOSES

GENERAL ELECTRIC

ELECTRIC FURNACES TO MEET ALL REQUIREMENTS...

With Protective Atmosphere Equipment, Where Required



SMALL box-type furnace—ideal for jobbing shop or small-scale production, operating up to 2500 F maximum.

BRAZING, annealing, malleableizing, sintering, gas-carburizing, porcelain enameling—these and many other heat-treating processes can be improved, expedited, or performed at reduced over-all cost (often *all three*) with G-E electric furnaces.

G-E furnaces are available in a great variety of types and sizes, both standard and special designs, to meet virtually all application requirements from 600 F to 3100 F. We can show you only a few typical equipments here—but remember that with every G-E furnace, from the smallest to the largest, you reap the benefits of General Electric heating leadership and "know-how."

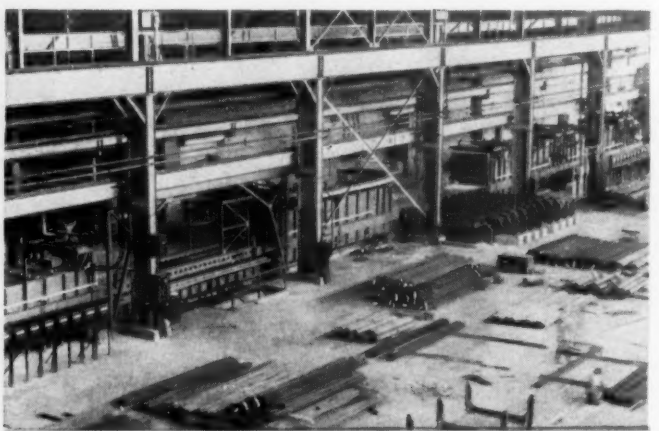
INTRODUCING NEUTRALENE!

Neutralene—a neutral, CO_2-free, dry furnace atmosphere—prevents surface decarburization in the heat-treatment of medium- and high-carbon steels. This atmosphere may be used in sintering, brazing, bright annealing, and hardening operations, and as a carrier gas for gas carburizing.

Neutralene is produced in a compact, portable equipment, which is designed for continuous, economical, low-maintenance operation.

Don't miss it at the National Metals Show.

MEDIUM—Mesh-belt conveyor-type brazing furnace for continuous brazing, annealing, or general continuous heating processes.



LARGE—A "complete process" equipment, this seven-chamber roller-hearth furnace includes heating, strain-relief, and tempering chambers, as well as a quench table and necessary handling equipment.

FREE! ASK FOR FURNACE CATALOG, GEA-4049

NEW HIGH-TEMPERATURE LABORATORY FURNACE Here's a brand new box-type furnace especially designed for experimental and other high-temperature work. Maximum operating temperature—3100 F. *See it at the Metals Show!*

HEADQUARTERS FOR

ELECTRONIC HEATERS

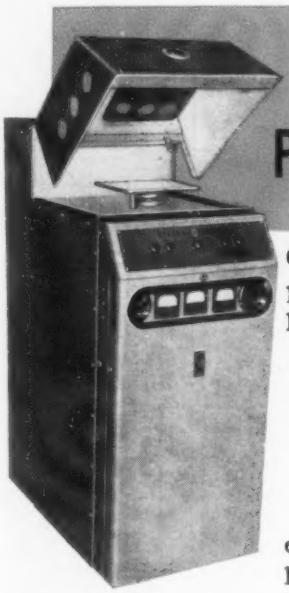
VERSATILE... FAST... PRECISE...

G-E 20-kw electronic induction heater with single-position worktable.

LITERALLY thousands of localized heat applications to practically any metal—steel, copper, brass, nickel—are possible with G-E electronic induction heaters. Case histories have repeatedly shown that you can harden, anneal, braze or solder at lower cost—and in a fraction of the time required by other methods.

G-E electronic heaters consistently assure uniform, high-quality output in heat-treating operations. The applied heat is localized to the exact area to be processed, and close control of both the time and intensity of heating is made possible.

Be sure to investigate how this new production tool will afford fast production, versatility, low cost, and uniform high-quality in your heat-treating operations.



THE NEW G-E PLASTICS PREHEATER

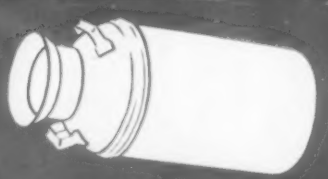
Operating at 40 megacycles with an output of 5 kw, the new G-E electronic preheater has these outstanding features:

Fast Heating	Portability
Simplified Operation	Automatic Cover
Minimum Floor Space	Two Timers
Easy Maintenance	

With these important advantages plus economical operation, the new dielectric heater makes possible *increased plastics production at lower unit cost.*

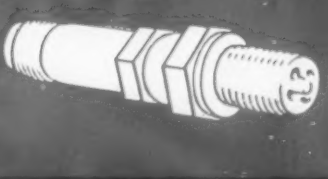
For detailed information, send for these free bulletins: "The How and What of Electronic Induction Heating"—GES-3290A 5-kw Electronic Dielectric Heater—GEA-4623.

ANNEALING



300 MILK CANS PER HR.

BRAZING

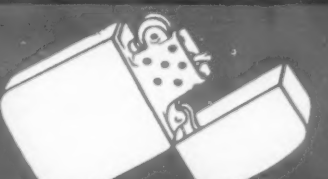


1000 SPARK PLUGS PER HR.

HARDENING

3600 PINS PER HR.

SOLDERING



PRODUCTION INCREASED TENFOLD

ELECTRIC HEAT IN INDUSTRY!

G-E CALROD HEATERS AND DEVICES

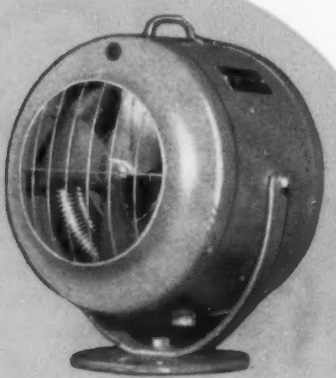
"BUILT-IN" heat for hundreds of applications

Whatever your specialized heating job . . . wherever you need localized heat in machines, pipes, or liquid baths . . . be sure to investigate G.E.'s line of Calrod heaters and devices. They are easy to install, economical to operate, exceptionally durable, and available in a wide range of shapes, sizes and ratings.

Complete information is given in Catalog GED-650C. Send for your copy today.

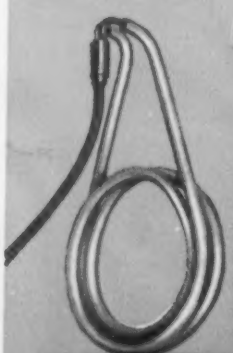
SOFT-METAL MELTING

For the fast, efficient melting of soft metals—lead, solder, tin, babbitt, and type metals—complete melting pots are furnished. Or, by using immersion metal heaters, you can convert your present melting pot to electric heat.



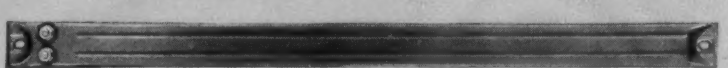
AIR HEATING

In area heating applications (keeping personnel comfortable, keeping materials or equipment up to temperature), forced or natural convection heaters are most suitable. In process air-heating applications (ovens, dryers, etc.), fin-calrod or strip heaters provide a wide temperature range with flexible control.



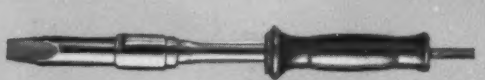
LIQUID HEATING

For heating water, oil, and many mild acid baths, G.E. provides "over-the-side" and "screw-in" type immersion heaters. This immersion method provides faster heating at lower cost by dissipating heat from within the liquid.



SURFACE HEATING

For surface heating applications—packaging machines, industrial hotplates, hydraulic presses, etc.—easy-to-install, tubular, strip or cartridge heaters are used. And for pipe heating, G-E "wrap-around" heating cable is most effective.



SOLDERING

G-E industrial soldering irons are designed for continuous, high-speed, trouble-free soldering for all types of industrial work. With non-freezing, easy-to-replace, calorized copper tips, you can maintain them right in your own shop.

LET US HELP YOU WITH YOUR HEATING PROBLEM

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GENERAL ELECTRIC

Gettin' dizzy?

If the things you hear about stainless steel have you whirling in circles, come to Rustless. We'll turn on a steady flow of helpful, authoritative information about stainless—how to machine, forge, heat-treat, cold-work, electropolish the most economical grade for your service conditions and fabricating requirements. Stainless is not difficult to work with, only a little different. If you are puzzled about how to turn stainless into your product, for sales appeal, for long life at low maintenance—for example, in high pressure needle valves—just tap the Rustless reservoir. Our cooperation is without obligation.

Rustless Iron and Steel Division, THE AMERICAN ROLLING MILL COMPANY, Baltimore 13, Maryland.
Sales offices in principal cities, distributors everywhere.

STAINLESS STEEL SPECIALISTS

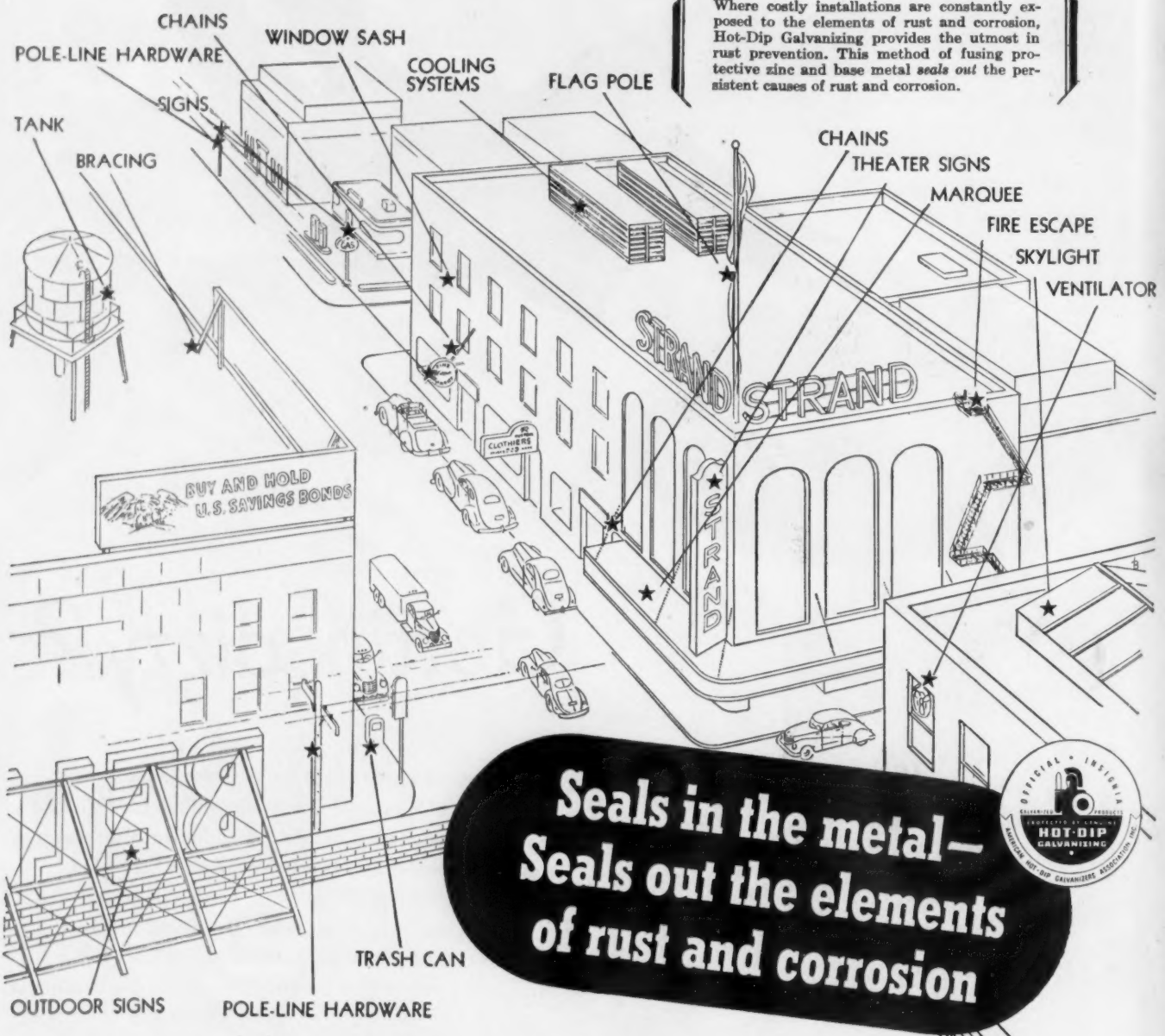
Rustless

DIVISION OF ARMCO

DIPPED IN MOLTEN ZINC

For the utmost in Rust Prevention

Where costly installations are constantly exposed to the elements of rust and corrosion, Hot-Dip Galvanizing provides the utmost in rust prevention. This method of fusing protective zinc and base metal *seals out* the persistent causes of rust and corrosion.



Seals in the metal—
Seals out the elements of rust and corrosion

OFFICIAL • INSIGNIA • HOT-DIP GALVANIZING • AMERICAN HOT DIP GALVANIZERS ASSOCIATION, INC.

ENGINEERS, architects, and builders—more and more are writing, "to be Hot-Dip Galvanized," into their specifications for exposed metal structures and installations. This time-proven method of dipping metal in molten zinc provides the utmost in rust prevention.

Only the Hot-Dip Method of Galvanizing creates a definite, protective bond between base metal and the layer of rust-inhibiting zinc by the fusion of the two metals.

Thousands of applications of Hot-Dip Galvanizing, many of them of twenty-five to forty years' standing, testify to the lasting value of this method of *preventing* rust and *providing* tremendous savings in costly replacement and maintenance costs.

Regarding your particular problems of rust and corrosion, write AMERICAN HOT DIP GALVANIZERS ASSOCIATION, INC., First National Bank Building, Pittsburgh 22, Pennsylvania.

For the best Zinc Coating use hot-dip GALVANIZING

HANSEN

Couplings

ACE INDUSTRY

HANSEN PUSH-TITE COUPLING

is composed of two parts —socket and detachable plug. They come in a wide range of standard sizes and are used for air, oil and grease. Socket and plug can be had with either male or female ends.

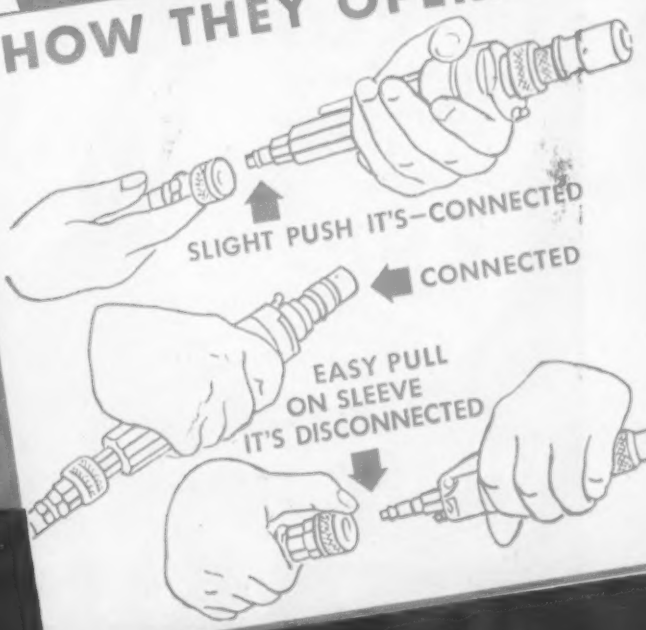
HANSEN 100 SERIES GASOLINE COUPLING

is composed of two parts —socket and detachable plug. Comes in a wide range of standard sizes. Both coupling and plug can be had with either male or female ends.

HANSEN 600 SERIES OXYGEN COUPLING

consists of socket and detachable plug and like the other Hansen Couplings they can be had in regular standard sizes with either male or female ends on socket and plug.

HOW THEY OPERATE!



HANSEN 700 SERIES ACETYLENE COUPLING

is composed of socket and detachable plug and comes equipped with standard left hand acetylene thread. Sockets and plugs can be had with either male or female ends in standard sizes.

Send for free catalog number 46 which contains the complete line of Hansen industrial equip...

HANSEN MANUFACTURING CO.

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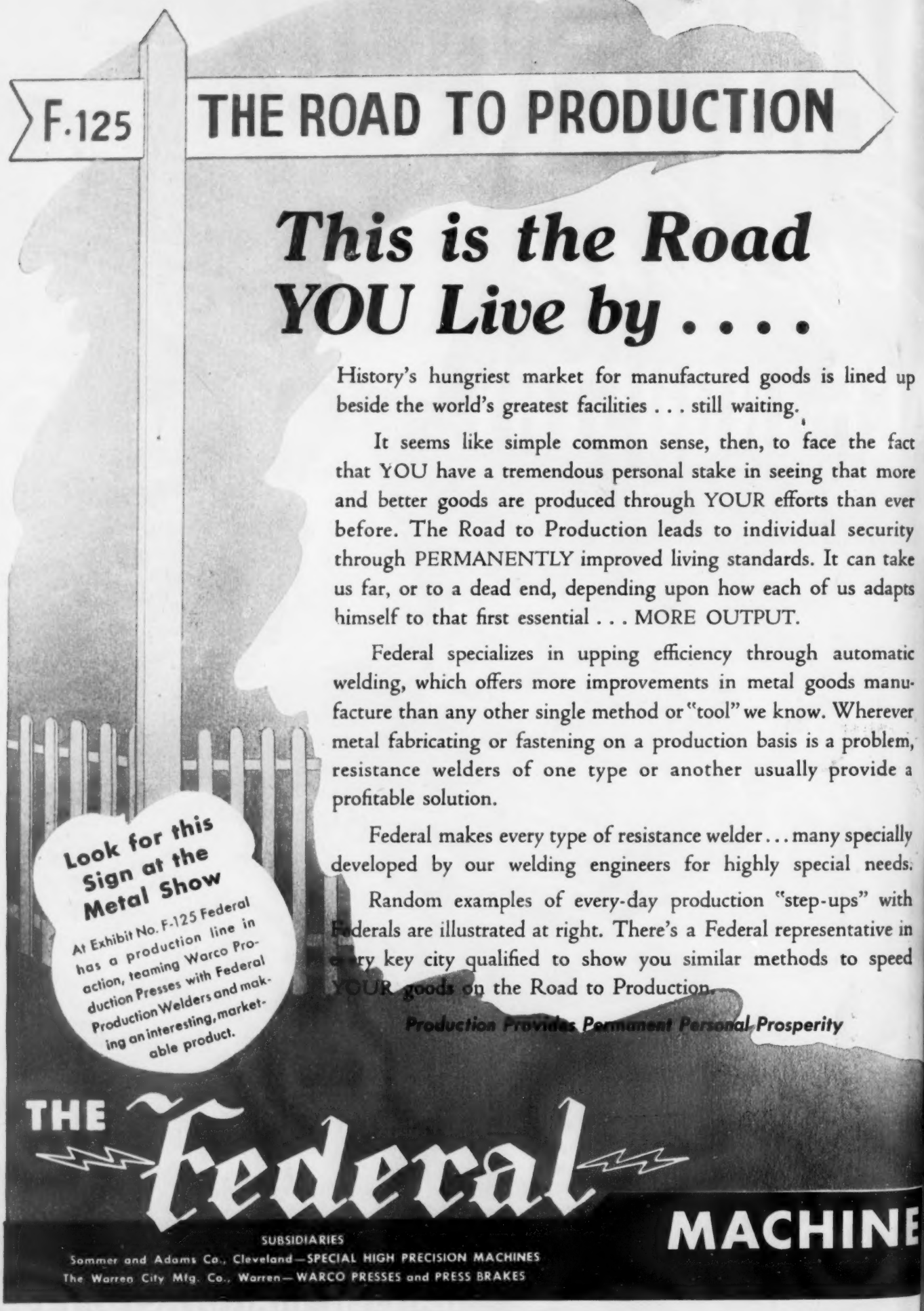

This is the Road YOU Live by . . . .

History's hungriest market for manufactured goods is lined up beside the world's greatest facilities . . . still waiting.

It seems like simple common sense, then, to face the fact that YOU have a tremendous personal stake in seeing that more and better goods are produced through YOUR efforts than ever before. The Road to Production leads to individual security through PERMANENTLY improved living standards. It can take us far, or to a dead end, depending upon how each of us adapts himself to that first essential . . . MORE OUTPUT.

Federal specializes in upping efficiency through automatic welding, which offers more improvements in metal goods manufacture than any other single method or "tool" we know. Wherever metal fabricating or fastening on a production basis is a problem, resistance welders of one type or another usually provide a profitable solution.

Federal makes every type of resistance welder . . . many specially developed by our welding engineers for highly special needs.

Random examples of every-day production "step-ups" with Federals are illustrated at right. There's a Federal representative in every key city qualified to show you similar methods to speed YOUR goods on the Road to Production.

Production Provides Permanent Personal Prosperity

Look for this Sign at the Metal Show

At Exhibit No. F-125 Federal has a production line in action, teaming Warco Production Presses with Federal Production Welders and making an interesting, marketable product.

THE Federal MACHINE

SUBSIDIARIES

Sommer and Adams Co., Cleveland—SPECIAL HIGH PRECISION MACHINES

The Warren City Mfg. Co., Warren—WARCO PRESSES and PRESS BRAKES

FOUR SEAM WELDS AT ONCE . . . SIX SETS PER MINUTE
PROJECTION WELDING 11,500 AUTO DOOR HINGES PER SHIFT
SPOT WELDING DEEP FREEZER PARTS
BUTT OR MITRE WELDING ALUMINUM SASH
FLASH WELDING 300 STEEL DRUMS PER HOUR

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MEMBER RESISTANCE WELDER MANUFACTURERS ASSOCIATION RWMA

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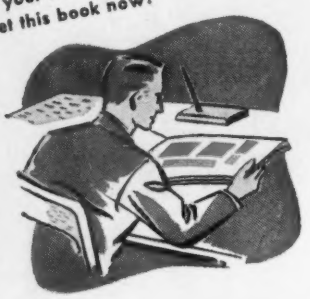
ELECTRO-SILVERY

A NEW BOOK FOR STEEL PLANT AND FOUNDRY EXECUTIVES

Important information on high silicon pig iron for steel plants and foundries . . . a valuable addition to your file of technical data. Get this book now!



IN THIS BOOK . . .
Scores of photographs, seven beautiful oil paintings, and interesting, informative text tell you about Keokuk's special methods of processing and casting of high silicon pig iron. The book relates the advantages of 60-pound Electro-Silvery pigs for steel plants and 30-pound pigs and 12½-pound piglets for foundries. Write today and request your copy!

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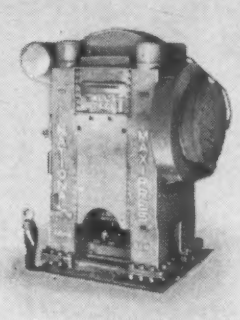
PRECISION

The above Caterpillar Side Bar Link is precision forged, flash trimmed, then coined on the original heat on National High Speed Forging Maxipresses.

Improved accuracy, increased output and impressive savings in materials and machining time are realized.

To explore the advantages of forgings made by the National technique, write for details or talk to a National representative.

★



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TIFFIN, OHIO.

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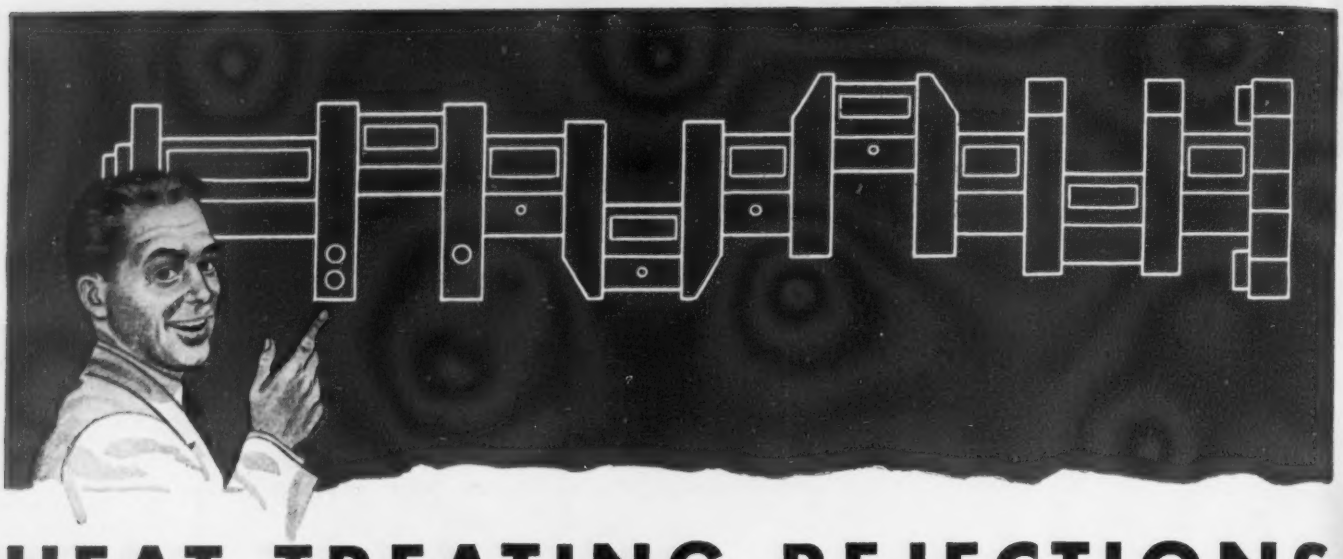

HEAT TREATING REJECTIONS DROPPED to .0025% with the

HAGAN

Automatic HEAT TREATING FURNACE

Rejections dropped from 2-3% to .0025% when a Mid-West manufacturer switched his heat treating of railway diesel engine crankshaft forgings to the Hagan Automatic Heat Treating Furnace.

More than six feet long and highly irregular in cross section, this 4000-pound forging presented a difficult problem in maintaining uniformity. Close metallurgical control plus Hagan *Automatic* Heat Treatment made possible this outstanding continuous quality record.

Hagan Furnaces are noted for their completely automatic control features . . . in many plants they have provided the one answer to uniform quality at high production rates. Hagan engineers are always available for consultation.

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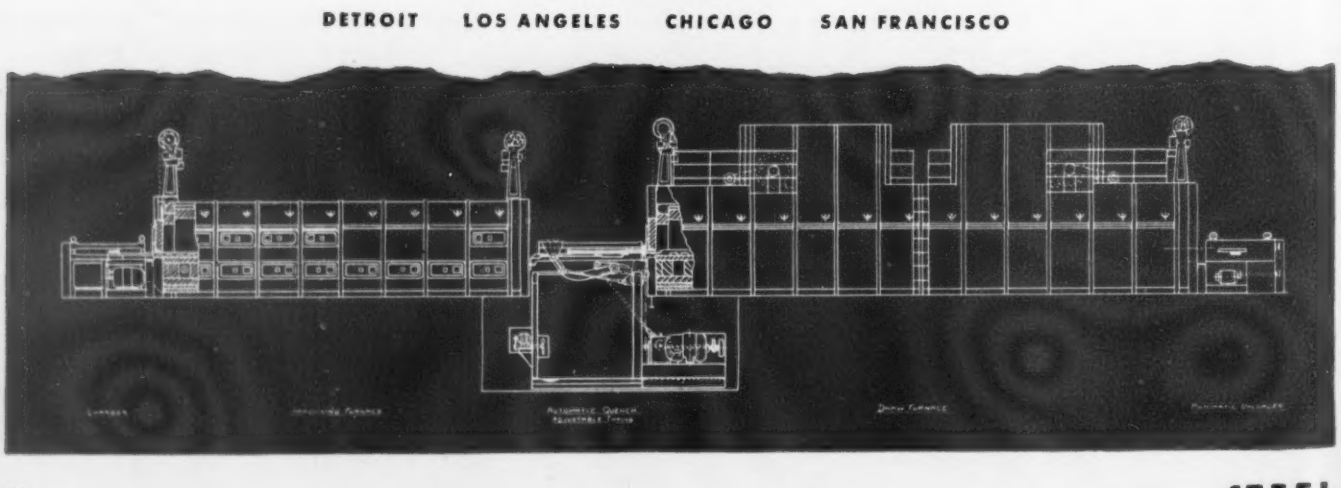

FOR CARBURIZED GEARS... CAMS... SPLINE SHAFTS

USE

CHROMIUM-VANADIUM STEEL, AISI A 6120

Better carburized parts . . . at lower overall cost . . . are obtained with Chromium-Vanadium steel, AISI A 6120.

Strong, hard and wear-resistant, the case developed by A 6120 steel is well integrated with a tough, ductile core. Superior case and core properties of this steel assure longer life and more dependable performance for gears, cams, bearings and shafts, with economy for the ultimate user as well as the manufacturer.

For most carburized applications of Chromium-Vanadium AISI A 6120 steel, a simple direct quenching and tempering treatment is sufficient.

Let us know the details of your carburizing problem. Our metallurgists will be glad to work with you in reaching a satisfactory solution.

Makers of

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FERRO ALLOYS, CHEMICALS and METALS

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Many difficult problems of design and fabrication have been solved by HAYNES

PRECISION CASTINGS

1. **Quality Alloys** having an unusual combination of properties can be readily precision-cast. Parts cast from HAYNES STELLITE alloy, HASTELLOY alloy, and various stainless steels are now available.
2. **Small or Mass-Production Quantities** of shapes difficult to obtain by other methods of manufacture at reasonable prices can be produced by precision casting.
3. **Improved Designs** result because parts can be engineered for performance rather than convenience of fabrication.
4. **Interchangeability of Parts** is assured, because HAYNES precision castings are uniform in quality, size, contour, and finish.
5. **Intricate Shapes**, contours, and thin edges are consistently reproduced. Internal and external threads, shoulders, and cored holes can be produced.
6. **Improved Metallurgical Properties** and sound, dense castings mean long life of stressed parts operating at high temperatures.
7. **Smoother, Cleaner Surfaces** than those generally obtained by conventional casting methods are possible.

For more complete information, write for the booklet, "HAYNES Precision Castings."

Here Are Some Samples of HAYNES Precision Castings in Use Today.

Haynes Stellite Company
Unit of Union Carbide and Carbon Corporation
UCC
General Offices and Works, Kokomo, Indiana
Chicago—Cleveland—Detroit—Houston—Los Angeles—New York—San Francisco—Tulsa

The registered trade-marks "Haynes," "Haynes Stellite," and "Hastelloy" distinguish products of Haynes Stellite Company.

HAYNES TRADE-MARK *alloys*

PLYMOUTH LOCOMOTIVES FOR SAFE, SMOOTH OPERATION

Hauling carloads of TNT is a job that calls for precision operation . . . smooth starts and stops. It's a job that's being handled by an 8 ton Plymouth Locomotive operating over 65 miles of track in the Joliet Arsenal. This Plymouth hauls 10 and 12 unit trains of specially-designed cars, transporting as much as 12 tons of TNT in one load.

This is work that requires ample reserve power . . . precise, positive-acting controls . . . exceptional maneuverability. It's work made to order for a Plymouth Locomotive, for Plymouths are designed and built for swift and efficient operation under the most exacting conditions.

If your intraplant haulage involves the transportation of materials and products that require careful handling, you'll want to know more about Plymouth Locomotives. Write today for the full story.

TRACK HAULAGE IS CHEAPER HAULAGE

PLYMOUTH LOCOMOTIVES

GASOLINE, DIESEL MECHANICAL AND DIESEL ELECTRIC

PLYMOUTH LOCOMOTIVE WORKS • Division of The Fate-Root-Heath Co., Plymouth, Ohio, U.S.A.

PENFLEXWELD
is a Versatile High-Pressure, Corrugated Tubing

. . . designed for a wide variety of applications in industrial plants

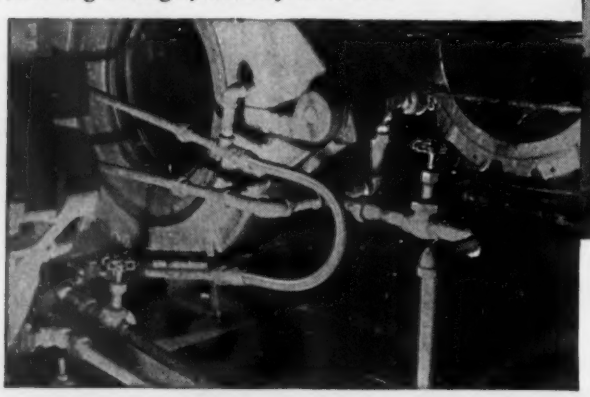
PENFLEXWELD Tubing is invaluable in handling volatiles, liquids and gases with penetrative or solvent characteristics. Its corrugated construction expands and contracts with temperature alternations, provides extreme flexibility and resists bursting, crushing, cracking and splitting. Its jointless length is seep-proof under practically all conditions of pressure and temperature.

PENFLEXWELD Tubing available with standard braiding and protective sleeve types. End fittings, Solseal for general use where temperatures do not exceed 250° F and Metseal for higher temperatures, provide a complete assembly of leak-proof, long-lasting service on split molds, platen presses, compressors, furnace doors, open hearth furnaces and many other installations. Write for Bulletin 90 C, describing sizes 5/32" to 2" I.D. and special literature on larger sizes.

Vibratory motion on refrigeration compressors is isolated at its source by short lengths of PENFLEXWELD.

Visit PENFLEX at the New York Power Show, Booth #248, December 2-7, 1946

Below—*Split molds of the tire vulcanizing type are often equipped with PENFLEXWELD to enable them to give longer, trouble-free service.*



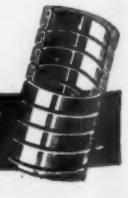
Open hearth operation requires tubing that resists extremes of temperature. PENFLEXWELD is designed to do that kind of job. Arrow points to 4" PENFLEX Interlocked Hose on high-pressure steam line.

PENFLEX SALES COMPANY

DIVISION OF

PENNSYLVANIA FLEXIBLE METALLIC TUBING CO.

Established 1902



7219 POWERS LANE **PHILADELPHIA 42, PA.**

THE NEWEST CONTRIBUTION TO FASTER, LOWER COST METAL JOINING...

EASY-FLO 45 and EASY-FLO 35

These new silver brazing alloys—Easy-Flo 45 and 35—offer **new low brazing temperatures** and **new low silver contents,** features that make possible the faster production of strong, ductile, leak-tight joints and lower costs on a wide variety of metal joining operations.

They have been created by Handy & Harman, originators of the well known silver brazing alloys, SIL-FOS and EASY-FLO. They are offered to industry **now** as a timely contribution to help lick two big problems—to increase production . . . and to decrease costs.

What will these New Alloys do for you?

AT THE METAL SHOW BOOTH F-147

See EASY-FLO 45 and 35 at work on actual production jobs. Examine the large collection of parts and products now made with low-temperature silver alloy brazing. See how others use fast handling and heating methods to boost production. Discuss your metal joining problems with our field engineers who will be on duty at all times. If you attend be sure to stop at Booth F-147.

—THAT'S THE QUESTION

We can tell you how lower flow point, lower silver content, faster spreading action and small amount of alloy save time and reduce costs. We can tell too, of tests that have won wide approval for these new alloys in the field. But if you want quick action, if you want to start saving and speeding-up NOW, try EASY-FLO 45 and 35 on your own work in your own plant. Ask **your regular supplier** for a free demonstration . . . or better still if you are familiar with this metal joining method place a trial order with him and put these alloys to your own tests on actual jobs.

HANDY & HARMAN

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to a demonstration
of its astounding

Oxyarc Process

for

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at the

National Metal Congress and Exposition
Atlantic City Municipal Auditorium
November 18-22, 1946

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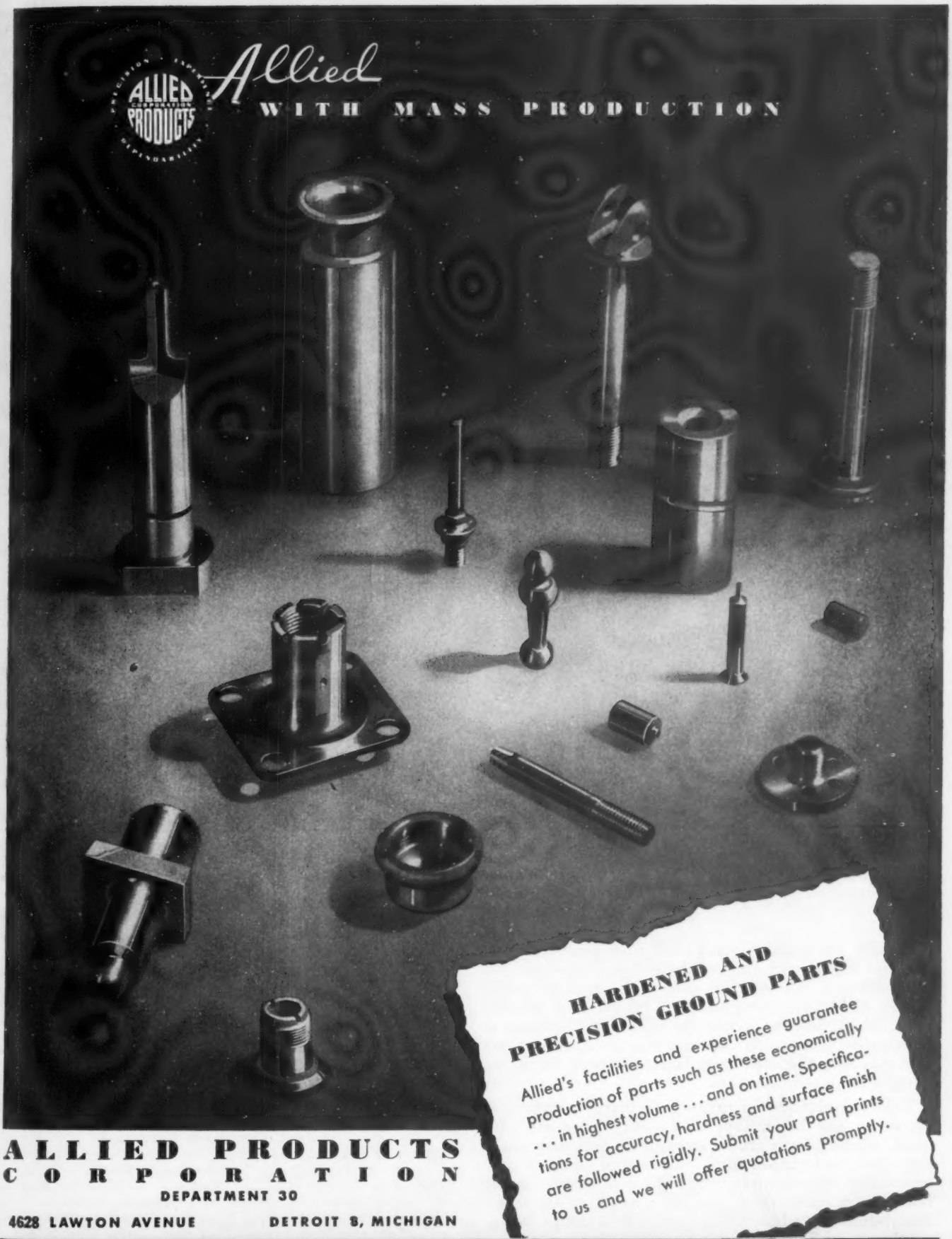
You are also invited
to discuss your stainless
and alloy welding problems



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Allied's facilities and experience guarantee production of parts such as these economically ... in highest volume ... and on time. Specifications for accuracy, hardness and surface finish are followed rigidly. Submit your part prints to us and we will offer quotations promptly.

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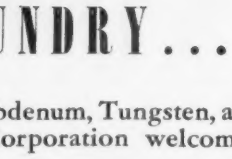
SHEET METAL DIES FROM THE LARGEST TO THE SMALLEST • JIGS • FIXTURES • STEAM-HEATED PLASTIC MOLDS
SPECIAL PRODUCTION TOOLS • R-B INTERCHANGEABLE PUNCHES AND DIES • DIE MAKERS' SUPPLIES

MOLYBDENUM IN THE FOUNDRY....

ROLLS are among many cast and wrought iron and steel products that have been improved by Molybdenum. Very small additions, rightly introduced, yield surprising results. In the case of mill rolls, Molybdenum makes the difference between a reasonably good roll and one that is stronger and and tougher, and especially better adapted for operating at high temperatures.

This is only one of many uses that Molybdenum serves to the betterment of foundry products. Its most valued effects are to strengthen and toughen—especially to improve high-temperature strength and uniformity of strength in both light and heavy sections. Foundry practice need not be altered at all when Molybdenum is added to any iron or steel composition.

The Molybdenum Corporation has a special pamphlet on the foundry uses of Molybdenum. As a supplier of Molybdenum, Tungsten, and other alloying materials, the Corporation welcomes the inquiries of any user.



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Subsidiaries: Cleveland-Tungsten, Inc., Cleveland, O.; General Tungsten Manufacturing Co., Inc., Union City, N. J.

Works: Washington, Pa.; York, Pa.

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MOLYBDENUM CORPORATION OF AMERICA

GRANT BUILDING PITTSBURGH, PA.

MCA

LET'S "TALK TORQUE"

about Faster Driving of Nuts, Bolts and Cap Screws

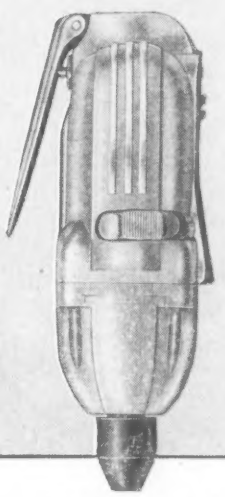
NEW *Thor* **⅜" PNEUMATIC**

IMPACT WRENCH

READY FOR IMMEDIATE DELIVERY

GREATER TORQUE ACTION—with no torque *reaction* to fatigue the operator—is the big feature of this power-packed, easy-handling Thor *reversible* Impact Wrench. It drives and removes nuts, bolts and cap screws faster because a new and more efficient *direct impact* mechanism and *short spindle* provide maximum striking power. No matter how tightly fasteners are to be driven, or how firmly they may be set, this amazing tool has the power and torque to handle the toughest jobs.

In addition, it's smaller, lighter and more compact—*it weighs only 3¾ pounds*—but it's sturdier and longer wearing. Simplified design reduces wear and insures smoother operation. You'll find it ideal for fast, low-cost production. *Try it*—ask your nearest Thor representative for a demonstration.



Model No. 6
GRIP THROTTLE
Only 5 7/16" long—⅜" capacity.

LEVER THROTTLE
Furnished in place of grip throttle, if specified. No extra charge. Ideal for vertical suspension work.

¼, ⅜, ¾ and 1¼" capacities will soon be available.

INDEPENDENT PNEUMATIC TOOL COMPANY
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Thor **PORTABLE POWER TOOLS**

PNEUMATIC TOOLS • UNIVERSAL AND HIGH FREQUENCY ELECTRIC TOOLS • MINING AND CONTRACTORS TOOLS

HE'LL WORK FOR YOU...

but you can't hire him

My name is Joe Blank. I've been a molder in the same foundry for 17 years.

My father—he was a molder, too—used to tell us kids: "This new country is a great place. It's much better than the old country, where an officer used to tell men where to work, what to do and where to live. In America, we work and live where we please; we have good jobs and good lives."

When he got me a job in the foundry, he said: "Maybe you will never own the business, but look on your workbench as your own part of the whole concern. Do every job as though you owned the business."

Then my boss told me all about my first molding job, a truck casting. He explained where it had to go and what it had to do. He said: "Joe, this part must take a lot of hard knocks. If it fails, there might be a wreck. Always remember that in this foundry we don't turn out wreck material. Our castings have got to stand up."

So I made that casting just the same as if it was going on my own truck—good enough to protect my own neck. And that's the way this whole shop works. It's the reason our customers like to buy our castings. My job is a good one. The work is sometimes hard, but I always have the feeling I'm making something useful.

* * *

That's Joe's story. It's the story of many thousands of men who produce steel castings for industry—for you.

The first step in building an improved product, or in cutting costs, is to plan it that way—a steel castings engineer can help you. Steel Founders' Society, 920 Midland Bldg., Cleveland 15, Ohio.

MODERNIZE AND IMPROVE YOUR PRODUCT WITH

STEEL CASTINGS

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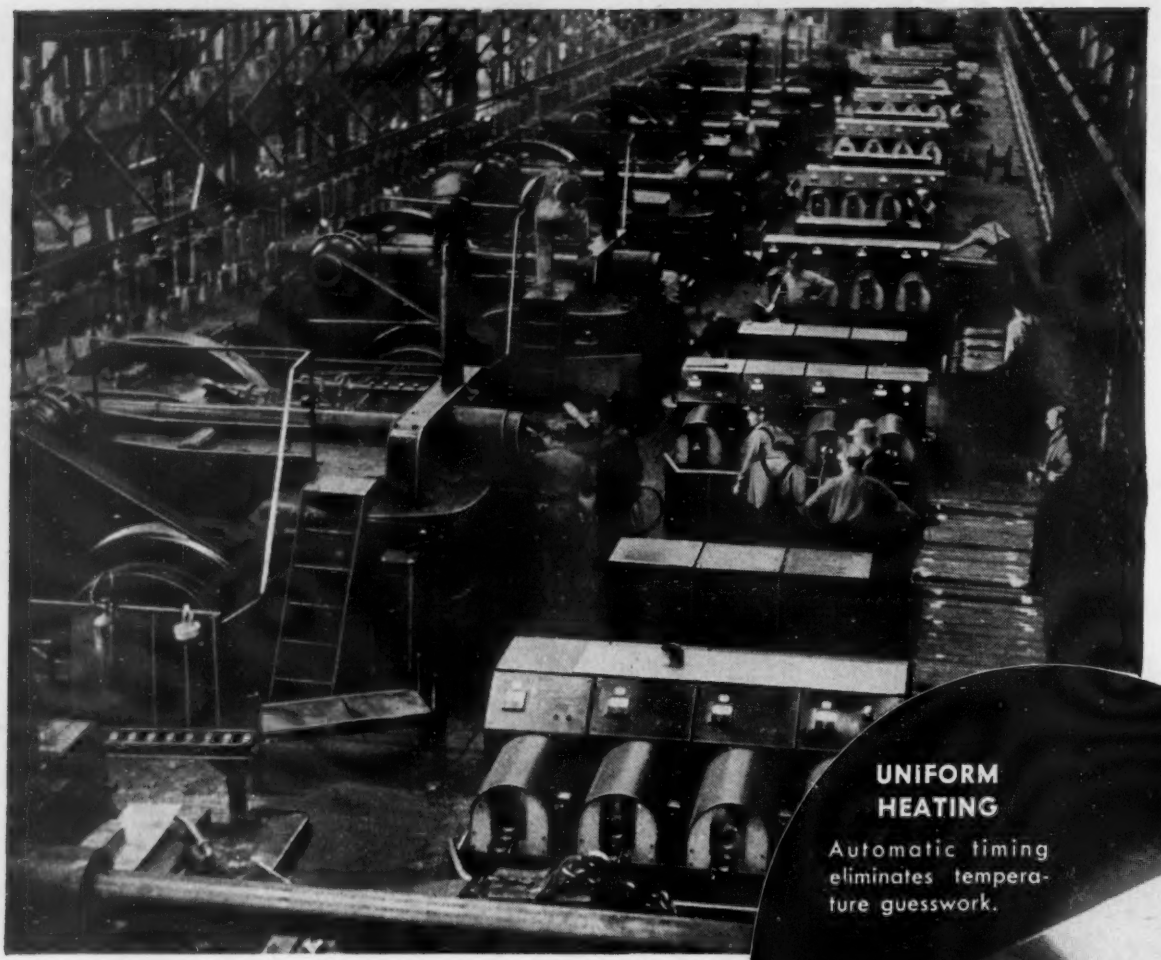


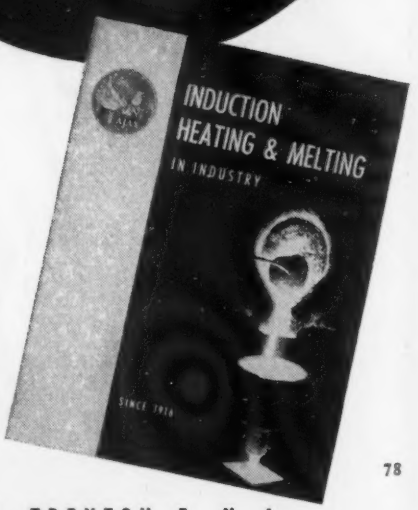
HERE'S FORGING HEAT *that's Economical*

Every 34 seconds, a 3-in. bar — at exact temperature — goes to the upsetting machine from each battery of 7 Ajax-Northrup induction heaters in this "forge shop of the future."

Cost analyses of installations such as this show that the unit production costs with Ajax-Northrup heating are lower than with other heating methods.

No heat is wasted — it's all generated right in the bar where it's needed, according to a predetermined temperature pattern.

Negligible scale results in longer die life, greater dimensional accuracy, and less "down time" for die cleaning and repairs. To convert from one job to another you simply change the coils or furnaces. Write Ajax for further details. Plan now to do your heating the fast, clean, economical Ajax-Northrup way.



Bulletin 27 shows many ways to use Ajax - Northrup heat. Send for it today

78

SEE BOOTH B-147 AT THE METAL SHOW

AJAX NORTHRUP Since 1916

AJAX ELECTROTHERMIC CORP., AJAX PARK, TRENTON 5, N. J.

HIGH-FREQUENCY HEATING · MELTING

AJAX METAL COMPANY, Non-Ferrous Ingot Metals and Alloys for Foundry Use
AJAX ELECTRIC FURNACE CORP., Ajax-Wyatt Induction Furnaces for Melting
AJAX ELECTRIC CO., INC. The Ajax-Hultgren Electric Salt Bath Furnace
AJAX ENGINEERING CORP., Ajax-Tama-Wyatt Aluminum Melting Induction Furnaces

ASSOCIATE COMPANIES

Large 350-ton Bucyrus walking dragline powered by one 6 cylinder Cooper-Bessemer Diesel which is direct-connected to the walking mechanism and dragline. It also drives a generator for all electrical requirements including motor drive of boom.

In Paul Bunyan's Coal Shovel...

a Cooper-Bessemer Diesel proves its stamina

THIS 350-ton giant, a walking dragline that takes seven-foot strides, could easily qualify as Paul Bunyan's coal shovel. Forty-five feet high, with a 160-foot reach and a 6-cubic-yard bite, it has been scraping up as much as 1,000 tons per day for the past two years in a western Pennsylvania strip mining operation.

Power for walking as well as digging comes from one six-cylinder Cooper-Bessemer Diesel. It is one of the most gruelling types of service known to engines.

However, routine checkups have shown surprisingly little wear of major engine parts. Main bearings have remained in excellent shape. Crankpins have shown no sign of scratching. Cylinder liners have stayed smooth, clean and round. Pistons and rings are practically like new. In short, here is a consistent record of true stamina and outstanding performance.

This engine's year-after-year reliability adds to a mountain of proof that you can always count on rugged Cooper-Bessemers for exceptionally long life and continuous trouble-free operation.

The
Cooper-Bessemer
Corporation

MOUNT VERNON, OHIO — GROVE CITY, PENNA.

NEW YORK WASHINGTON TULSA
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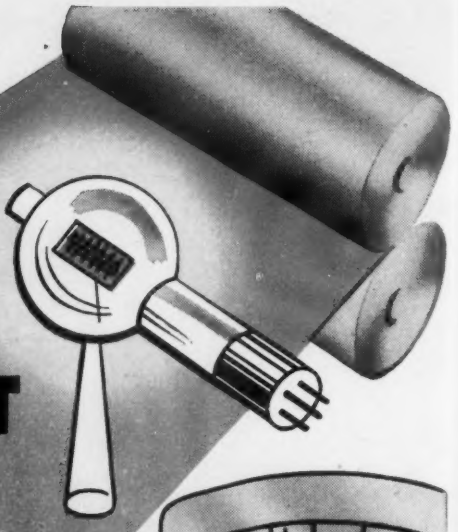
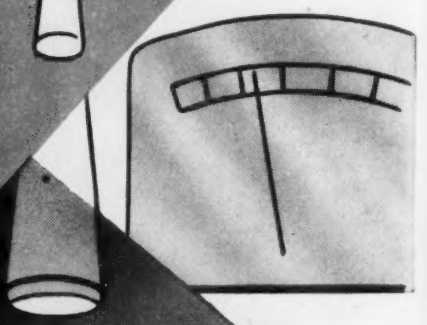
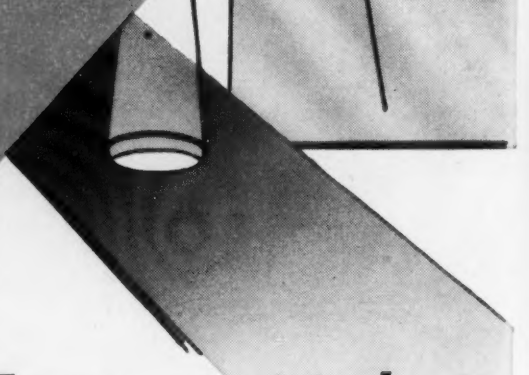
Gaging WITHOUT CONTACT







At a Speed as Fast as Light!

Hot sheets or strips of metal or foil flying from the rolls; paper emerging in a never-ending sheet; or the plastic or rubber blanket flowing from a calender, may be checked instantly for thickness, and this thickness controlled during the process, by the Sheffield Measuray.

Temperature of the material to be checked and its speed of movement do not affect the accuracy of the thickness check. Proximity of gaging head to material is not important—it can be as much as a foot or more distant, depending upon the application. Amplification and sensitivity are available in excess of any known industrial requirements without sacrifice in speed, range, or dependability. For instance, it is possible to amplify one per cent of the thickness of the stock being checked to extend over the full scale range.

The Measuray may be mounted on a production machine, or it may be used at the bench to measure stationary objects, especially those whose surfaces might be marred by a contact gage, or those of such resiliency that the contact gage measurements are not practicable.

See the Measuray demonstrated at the Sheffield plant in Dayton. Bring samples of work to be checked to see for yourself the savings in material and time, elimination of losses in destructive testing, and the increase in uniform quality which the Sheffield Measuray can bring you.

If a visit is not convenient, write us for detailed information. For an early installation, ask for a survey to be made in your plant by Sheffield engineers—no obligation on your part.

Write to Department K

Real job security is only provided by plentiful incoming orders shipped at prices consumers can afford and want to pay . . . modern machine tools help make this possible.

METAL CONGRESS BOOTH H-234

SHEFFIELD

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Dayton 1, Ohio, U.S.A.

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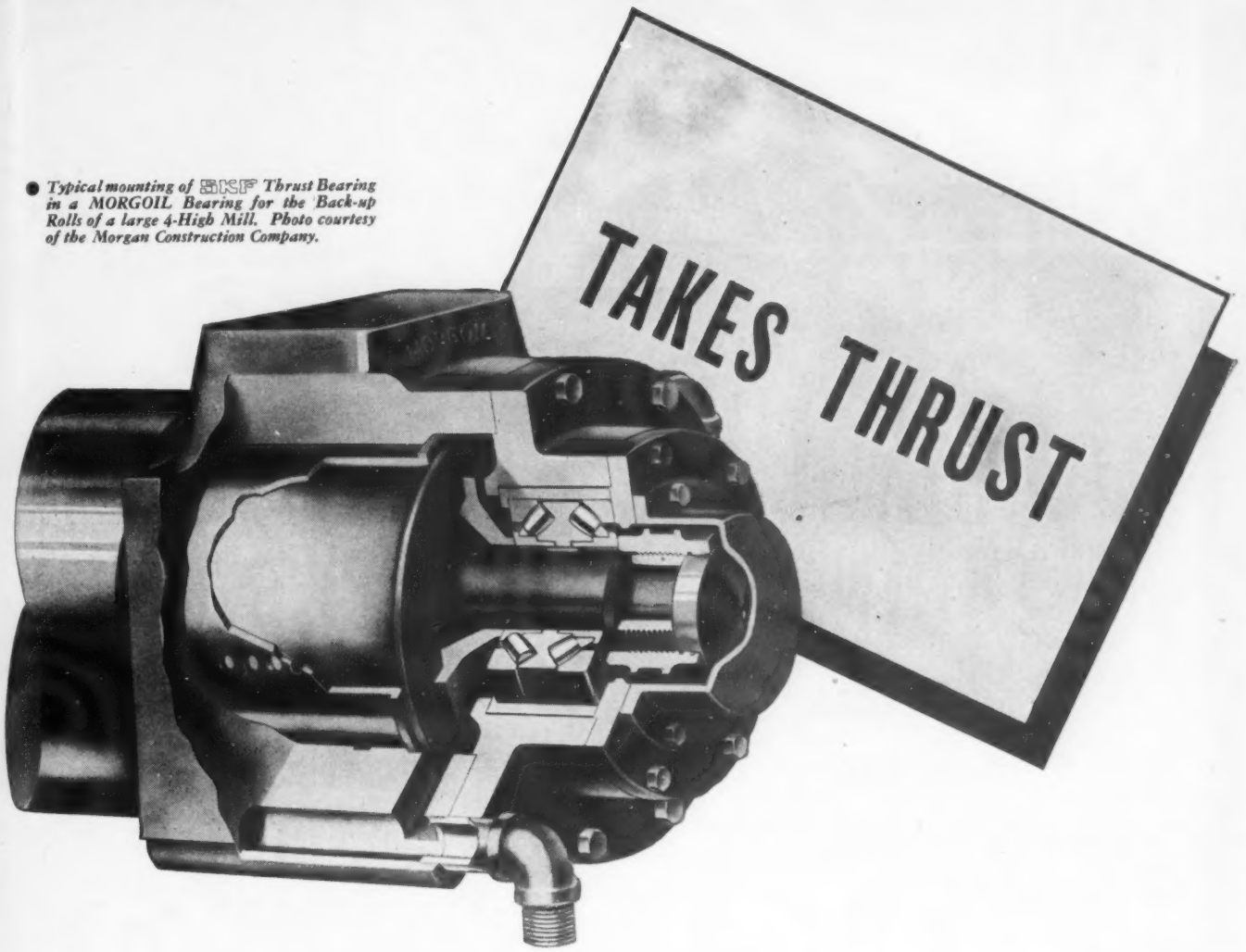

● *Typical mounting of SKF Thrust Bearing in a MORGOIL Bearing for the Back-up Rolls of a large 4-High Mill. Photo courtesy of the Morgan Construction Company.*

Designed to carry the heavy thrust loads on back-up rolls, this double directional adaptation of the SKF Spherical Roller Thrust Bearing has all the desirable features:

1. *High thrust capacity.*
2. *Rolling alignment.*
3. *The ability to run at sustained high speeds.*
4. *Very low friction.*

Specify SKF — the Right Bearing in the Right Place.

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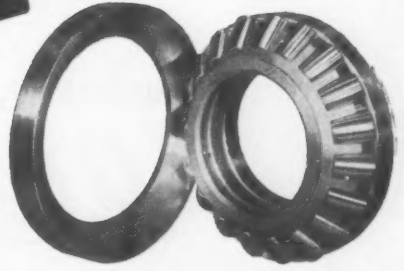
SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.

SKF

SPHERICAL ROLLER THRUST BEARINGS



STEEL TUBING

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MECHANICAL TUBING

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STAINLESS

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9200 BLAINE AVE., CLEVELAND 6, OHIO
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A Complete Tubular Service

DoALL *Contour Sawing*

★ ★ ★

World's Fastest Metal-Removing Process
The Miracle Method of Low-Cost Production

Differing from all other metal-cutting processes *Contour Sawing* is the only economical process for countless production jobs. It cuts parts, even intricate shapes with internal and external contours, in minutes—not hours or days.

A tough, variable-speed band with hundreds of razor-sharp teeth—so hard that even a file won't nick them—*slices* off metal as thick as 30"—does not consume time "shaving" metal to worthless chips. Continuous cutting—no wasted backstroke.

You'll be amazed how *Contour Sawing* "cuts down time". Write for illustrated booklet "DoALL Equals Ten Plus", which compares time savings of *Contour Sawing* with other processes.

The DoALL *Company*
Reg. U. S. Pat. Off.

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MACHINE-TOOL DIVISION
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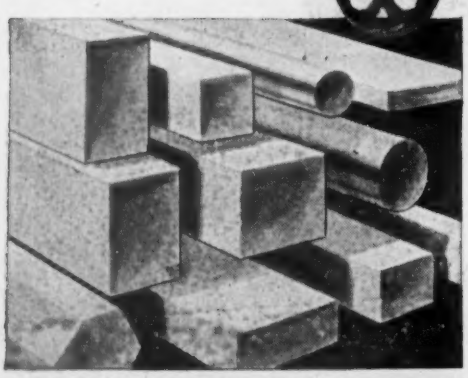
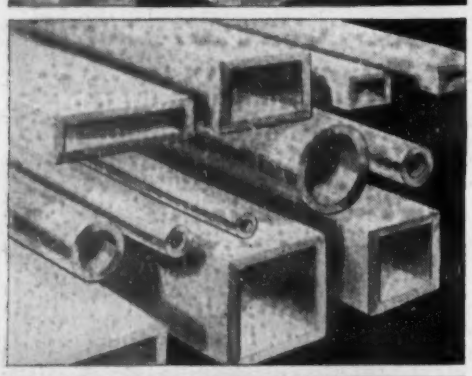
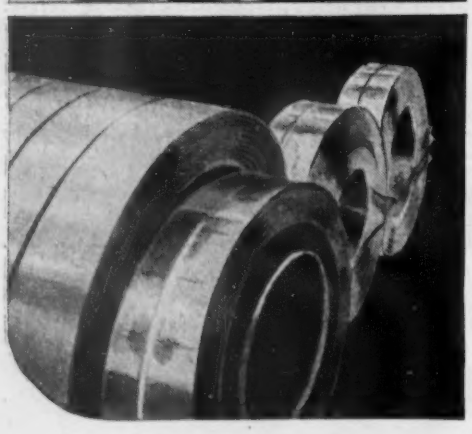
Brass Mill Products Quickly!







A large supply of brass mill products is now offered to the trade at unusually low prices. The entire inventory may be fabricated by normal production methods and is being sold in production quantities.

The inventory includes: Free Turning Brass Rod—1 inch diameter and larger; Copper and Brass Tubing—3 inch O.D. and larger; Naval Brass Rod—various diameters; Aluminum Bronze, Manganese Bronze and Silicon Bronze in various shapes.

• • •

This material is offered in the following sequence as provided by law: (1) Certified Veterans of World War II; (2) Subsequent priority claimants; (3) Non-priority purchasers. Federal agencies have had opportunity to fulfill their needs. VETERANS OF WORLD WAR II should apply to their nearest WAA Regional Office for certification; the case number assigned and the location of the certifying office must be stated in a Veteran's offer to purchase.

EXPORTERS: The War Assets Administration solicits your inquiries. Communicate with your foreign clients promptly.

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157-SA

BWH

DEPENDABLE RUGGEDNESS

HOW TO GIVE A DAM A FACE LIFTING

USE BWH AIR DRILL HOSE

One of the country's big dams needed a new concrete facing. But before it could be applied, the wall had to be "roughed" with compressed air . . . to give it an irregular pattern that would hold the new concrete.

The air hose selected for this job had to withstand high pressures, the oil and heat of compressors, and the constant impact of jagged edges of broken concrete. Naturally, BWH BAY STATE Air Drill Hose was the contractor's choice. This quality air hose is made with the highest grade oil-resistant tubing and has multiple plies of heavy cotton duck set in strong, flexible rubber for added ruggedness.

When next you need heavy-duty air hose, look to BWH for dependable ruggedness . . . BWH distributors for dependable service.

HAVE YOU A JOB WHERE STAMINA COUNTS?

Bring us your toughest problems . . . we're specialists in solving them. Consult your nearest BWH distributor, or write to BWH direct.

BOSTON WOVEN HOSE & RUBBER COMPANY

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YESTERDAY...

The Problem Was Still Unsolved

Steel men know that entrapped hydrogen causes porosity... other more obscure defects... weakens the strength of electric furnace steels. Flushing out the hydrogen with an inert gas seemed the best solution. But what gas? Nitrogen?... Carbon Dioxide?... Carbon Monoxide?... Chlorine?... Helium?... Each was tried... each had its drawbacks. And, in the meanwhile, Airco's research staff was bending every effort to solve the problem.

TODAY...

"Argon Flushing" Is the Answer

Airco technicians soon realized that Argon was the gas the steel industry was looking for. It is insoluble in steel... unreactive... and not only rids the molten metal of hydrogen, but floats the finely disseminated particles of slag, oxides, and other foreign matter to the surface as well.

AND TOMORROW

Airco—producers of Argon, Oxygen and other industrial gases—will continue to contribute to new and better ways of steel production... not only in the direct application of various gases but also in the creation and development of the tools of the future.

Airco's Technical Sales Division is at the call of steel men in applying Airco processes in the solution of their problems. For additional information, get in touch with your nearest Airco office or write: Air Reduction, 60 E. 42nd St., New York 17, N. Y. In Texas: Magnolia Airco Gas Products Company, Houston 1, Texas.

AIRCO **AIR REDUCTION**

Offices in All Principal Cities

ORIGINATORS OF MODERN OXYACETYLENE METHODS FOR THE STEEL INDUSTRY

Eliminate AVOIDABLE MAINTENANCE

The machinery you design and manufacture will require practically no maintenance, if

LUBRICANT IS RETAINED FOREIGN MATTER EXCLUDED

THAT IS PRECISELY THE REASON PROGRESSIVE AUTOMOTIVE AND MACHINERY MANUFACTURERS use

CHICAGO RAWHIDE MANUFACTURING COMPANY

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66 YEARS MANUFACTURING QUALITY MECHANICAL LEATHER GOODS EXCLUSIVELY AND NOW SIRVENE SYNTHETIC PRODUCTS

85 days from START to FINISH

MASSEY-HARRIS Production Speeded by Prompt DESPATCH Service

IT TOOK JUST 85 DAYS to design, build and install the large 117-foot tunnel conveyor DESPATCH Finish Baking Oven at Massey-Harris' new plant at Racine, Wis. Ordered April 25, the oven was ready for operation July 19, 1946.

Equipped with a 3,000,000 BTU direct fired gas heater this oven operates at 180° F. and finishes up to 40,000 lbs. per hour.

This speedy installation was made possible by complete cooperation of the customer, active expediting of materials, and smooth inter-coordination of purchasing, engineering and production within DESPATCH'S large organization. Result: better finishing and increased production.

Whether you need a single oven or a complete Finishing System, you can depend on the ability and experience behind 44 years of DESPATCH service. It can help you get into production *weeks or months ahead of your most optimistic estimates!*

WIRE, PHONE, OR WRITE immediately if you are in urgent need of finishing equipment.

DESPATCH OVEN COMPANY MINNEAPOLIS 14 CHICAGO 1

DESPATCH OVEN CO.
617 S.E. 8th St. • Minneapolis 14, Minn.

Shown above is the welded Yoloy frame of a well known Van trailer, and below is a view of the finished vehicle. The manufacturer says, "To build a trailer strong, yet light in weight requires careful selection of material and the proper application of the material in construction."

THROUGH the use of Yoloy high-tensile steel the engineers who designed this trailer body combined exceptional strength with light weight. Upon completion this well known Van trailer is welded into an integral unit; strong enough for years of profitable service yet light enough for profitable pay loads.

Yoloy is Youngstown's nickel-copper low alloy steel. This fabricator, like many others has proved Yoloy is tough and strong. Yoloy has good welding qualities, also, which makes it an ideal material for light weight construction. As its corrosion-resistant characteristics are outstanding, Yoloy-built equipment can give long, satisfactory service even under severely adverse conditions.

Call the nearest Youngstown District Sales Office or write us direct for full information on Yoloy.

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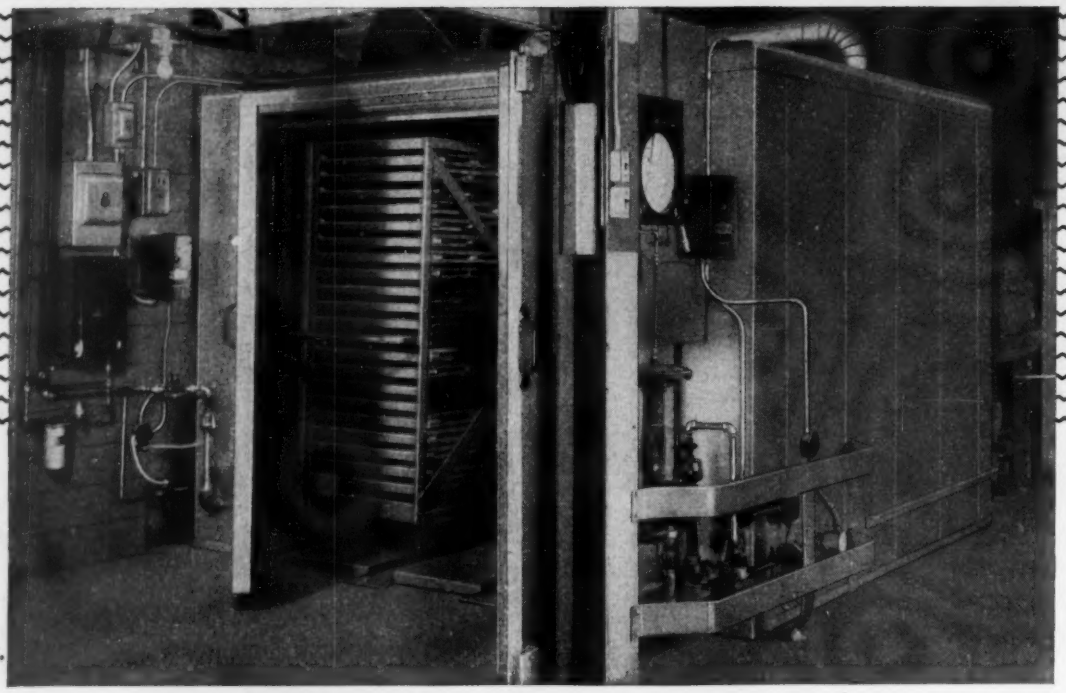

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DSM

CROSS FLOW CIRCULATION

FOR ACTUAL SURFACE CONTACT

Properly applied, DSM designed CROSS FLOW heating systems effects a gentle wiping action on all surfaces—sides —tops—bottoms—of your product, to be dried or processed. Resulting in speedier baking and a more uniform product.

Drying from center outwards avoids case hardening

WE WANT TO BUILD ***YOUR*** *OVENS*

PLANT ENGINEERING: *Consulting assistance in plant layout to coordinate departmental operations, our experience dated from 1917 in this field.*

Such plant layout may be based on increasing production beyond present capacity, or it may be a rearrangement in this post-war period when operations are conducted under a new set of conditions.

MOTOR CLEANING EQUIPMENT: *Washing machines for cleaning teardowns. Kerosene spray or similar solvent usually used as the cleaning medium.*

FORMED COWLINGS, PANELS, ETC.: *To your specifications, and of light metal alloys as required. Weldments and brazed assemblies may be under controlled atmosphere.*

PILOT EQUIPMENT: *Sample size equipment for development of heavy equipment.*

VERTICAL CORE BAKING OVENS • CONTINUOUS HORIZONTAL BAKING OVENS • BATCH TYPE CABINET OVENS • DRAWER OVENS

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PAINT SPRAY HEATING, VENTILATING, COOLING, DRYING, HUMIDIFYING SYSTEMS, JAPANNING AND INDUSTRIAL OVENS, INDUSTRIAL WASHING MACHINES

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When the switchboard operator at Weirton makes your connection, you have a direct line to fast action on your steel problem. For Weirton is an integrated mill. Sales, metallurgy, production and shipping are closely coordinated "under one roof" to provide on-the-spot information, quick decisions, great flexibility of production.

Weirton's highly integrated operation enables us to give you faster, more specialized service on all the steels we make: Weirite, Weirzin, Weircoloy, Weiralead . . . hot and cold rolled strip, sheets and ternes . . . cold rolled spring steel . . . N-A-X High-Tensile.

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WEIRTON, W. VA. *Sales Offices in Principal Cities*

Division of **NATIONAL STEEL CORPORATION**

Executive Offices, Pittsburgh, Pa.

Brutes for Strength

1 ***Greatest Shock Absorbing Capacity*** of any type single-row bearing. Here's the secret: Norma-Hoffmann Precision Roller Bearings provide full line contact between rollers and races. That means you get, size for size, a maximum area to support shock load.

2 ***Handles Up to 50% Overload*** Full line contact, the design feature of these bearings, also provides ample margin for severe temporary overloads.

3 ***Lowest Coefficient of Friction*** under heavy load of any type bearing, plus unsurpassed speedability. These important benefits are a result of Norma-Hoffmann's 100% machined bronze retainer, precision workmanship and short, parallel roller design.

When the going is so tough no other anti-friction bearing will stand up—use Norma-Hoffmann Precision Roller Bearings. You will continue to get dependable service under critically severe conditions of speed, load, shock and vibration. These bearings are precision-made to unusually exacting tolerances and are backed by years and years of proved performance. Norma-Hoffmann Bearings Corporation, Stamford, Conn.

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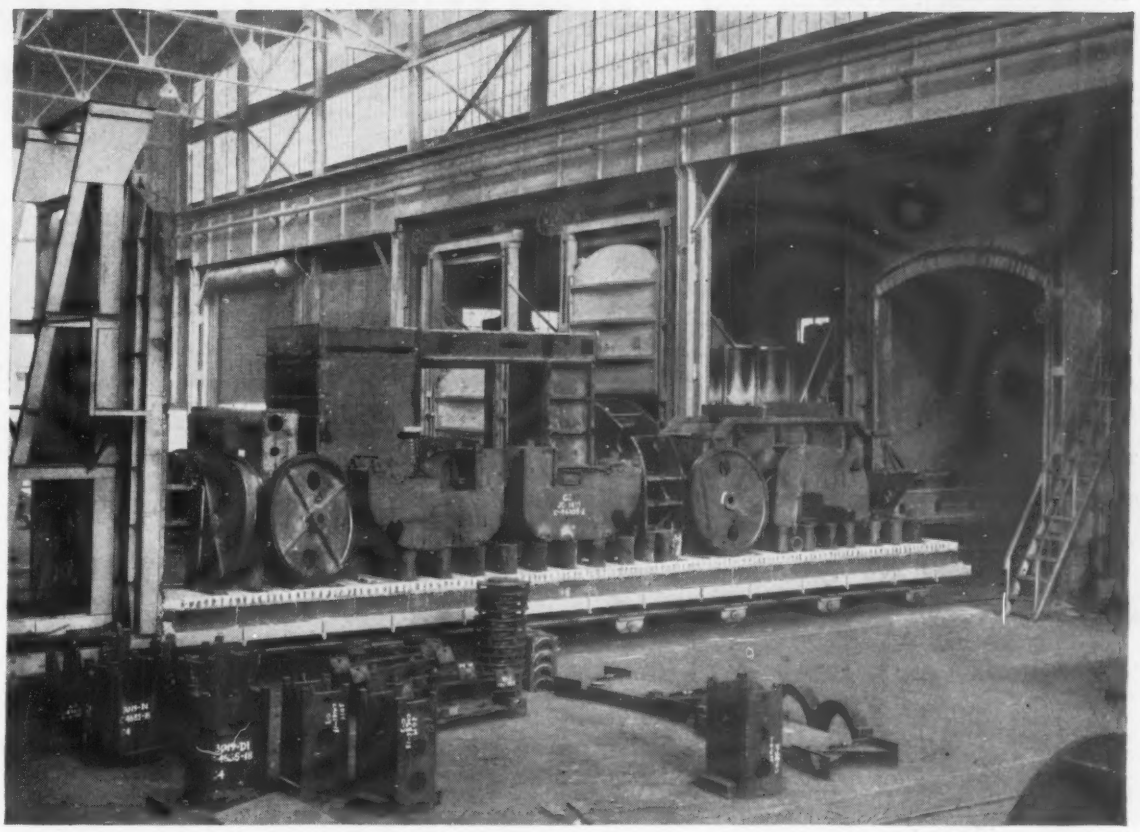
Precision Ball, Roller and Thrust Bearings

FIELD OFFICES: NEW YORK, CHICAGO, CLEVELAND, DETROIT, PITTSBURGH, CINCINNATI, LOS ANGELES, SAN FRANCISCO, PORTLAND, ORE., SEATTLE, PHOENIX

Warco PRESSES

WELDED STEEL PRESSES

(FULLY STRESS RELIEVED)



"Baking" Strength into the Unity of Metals

● The inherent stiffness of steel plate is 2½ times that of gray iron castings and 1½ times that of Meehanite or high test castings.

Warco press engineers have capitalized on this advantage in designing and building the advanced line of Warco welded steel presses.

In actual construction, they go even further to help assure the maximum rigidity so necessary to long die life.

All welded parts are "baked" at 1150 degrees F for a pre-determined period of time in one of our three custom built annealing furnaces, to give additional strength to the perfect union of metals in the weldments.

This stress-relieving of weldments, though a routine step in fabrication of Warco presses, is vitally important. It virtually eliminates locked up stresses that might otherwise build up and contribute to the hazard of misalignment from overload in service.

There's a Warco press for every type of production requirement. We are in position to give prompt delivery on most standard models. Your inquiry will receive immediate attention. Consult us today.

THE WARREN CITY MANUFACTURING COMPANY

1956 Griswold Street, Warren, Ohio

A subsidiary of The Federal Machine & Welder Company • Offices in Principal Cities

ECCENTRIC GEAR PRESSES • OBI PRESSES • HYDRAULIC PRESSES • MECHANICAL PRESS BRAKES

HORN PRESSES • DOUBLE CRANK PRESSES

An Unusual Service for PRECISION *Sub-contracting*

ATLAS . . . with its highly technical staff of 400 engineers, machine and product designers and toolmakers, is now in position to offer the services of its personnel and complete machine and assembly sections to a few manufacturers who require precision sub-contracting of radar units, instruments or other types of difficult assemblies.

We have undertaken and successfully produced many "secret" components for war plants and with that experience have something to offer you that goes far beyond the abilities of the normally "good" plant.

Here is what we can do for you:

I Provide complete engineering service for new projects . . . finish your partially completed work.

II Design and build all tooling for production (either in your plant or ours).

III Produce, assemble and test intricate, precise units or products on sub-contract.

IV Design and build high speed automatic special machines for any type of production.

On request we will send you the Atlas brochure which explains in detail all of our services and pictures the modern engineering, machine and assembly sections of our plant. If you desire quick action, telephone or telegraph for a consultation with one of our key men. It is quite probable that we can lift "a load off your shoulders onto ours".

An Award for ARMY E NAVY *Precise Production*

ATLAS TOOL & DESIGNING CO.
ATLAS METAL STAMPING CO.
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FOR TODAY'S TOUGHER JOBS, HERE'S A NEW TOUGHER MOTOR

WHERE IT'S WET Wet weather doesn't bother the new totally-enclosed Tri-Clad motor. Neither do frequent "washdowns" in food. plants.

WHERE IT'S CORROSIVE Acids, alkalis, and fumes are kept out of these new Tri-Clads. Cast-iron enclosures are corrosion-resistant, extra strong.

WHERE IT'S DIRTY Dirt and dust can't get into these Tri-Clads to shorten their life. Smooth surfaces are convenient to clean.

WHERE IRON DUST FLIES Harmful iron dust and metal filings can't get past the inner wall. Bearings are protected from dust.

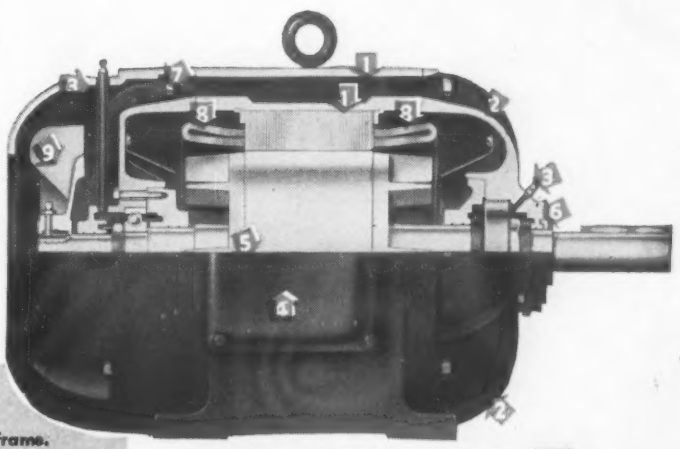
WHERE QUARTERS ARE CLOSE When space is limited for a totally enclosed motor, you'll like these trim, compact new Tri-Clads.

WHERE EXPLOSION HAZARDS EXIST The new Tri-Clad motors are available in explosion-proof constructions where needed.

THE G-E TRI-CLAD TOTALLY ENCLOSED MOTOR

(1 TO 1000 HP)

In 1940 you welcomed the Tri-Clad open motor with it's *extra protection features*. More Tri-Clads have since gone into service than any other integral-horsepower motor. Now G.E. is ready with a new line of tough, totally enclosed Tri-Clad motors for use in adverse atmospheres. *We believe they are industry's most dependable motors*. Their longer life and lower maintenance will make them a sound investment on almost every job. Apparatus Dept., General Electric Co., Schenectady 5, N. Y.



10-POINT PROTECTION

1. A cast-iron, double-wall frame completely encloses and protects the windings and punchings.
2. Corrosion-resistant cast-iron end shields are machined to provide a tight seal, and protect the motor from dust, dirt, and moisture. Primer and finish coat of Glyptal* varnish affords high rust-resistance.
3. A pressure-relief greasing system, which can be packed with long-life lubricant, protects the bearings.
4. The cast-iron conduit box is diagonally split for easy wiring. Boxes are independently explosion-proof on Class I motors.
5. Nonshrinking compound around motor leads protects motor interiors from dust and moisture at the point where leads pass through the frame.
6. Rotating labyrinth seal further protects motor interior from damage by foreign matter.
7. Large air passages provide adequate protection from overheating. They're easy to keep clean and open, too.
8. Modern, "ageless" insulation treatment includes windings of *Formex magnet wire.
9. The powerful external fan is removable to simplify maintenance; nonsparking type in explosion-proof motors.
10. Individual dynamic balance of rotors and external fans protects against vibration hazards, even under severe operating conditions.

*Trade-mark Reg. U. S. Pat. Off.

FOR THE COMPLETE STORY

Apparatus Department, Section B 750-278C
General Electric Company
Schenectady 5, N. Y.

☐ Please send me GEA-4400, which describes the new Tri-Clad totally enclosed motors.

☐ Please send me GEA-4131, "Motors and Control for Hazardous Locations."

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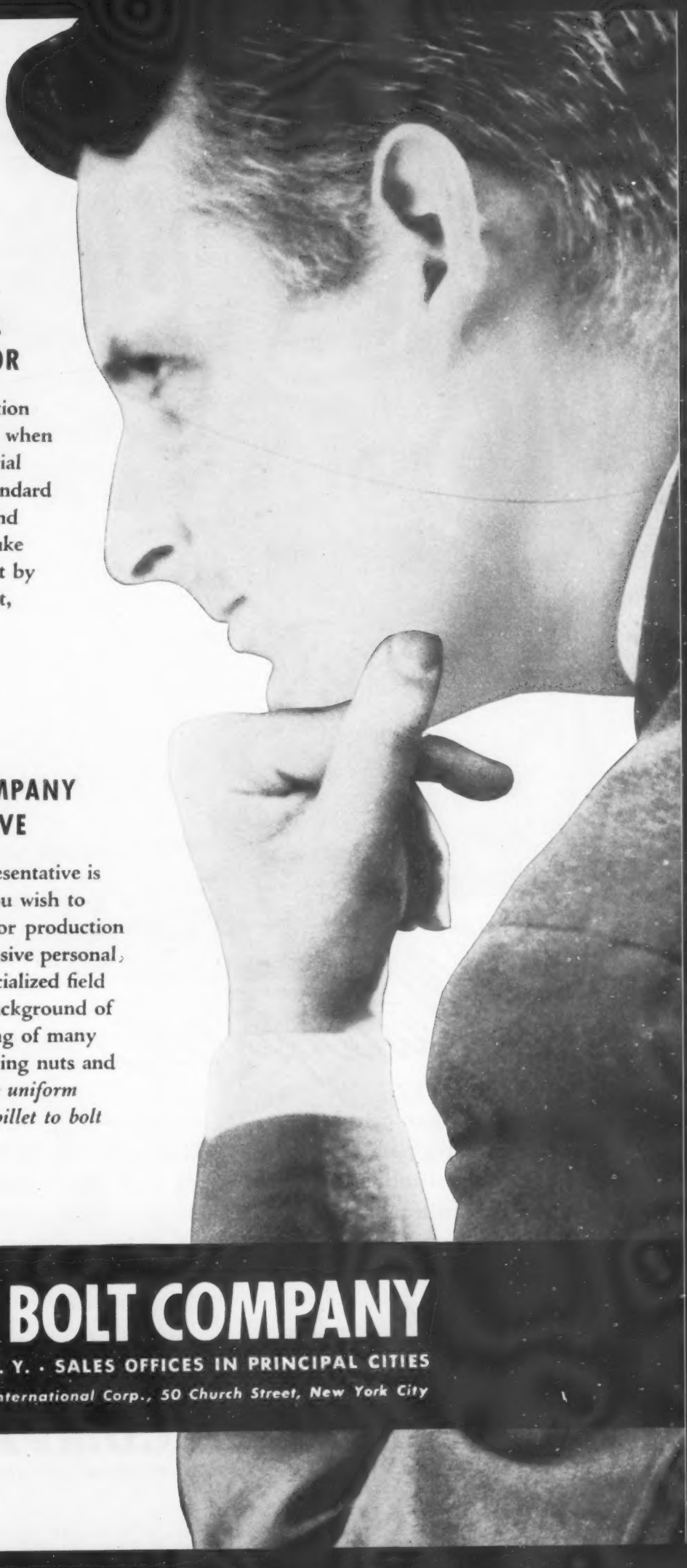
GENERAL ELECTRIC

Here's the purchasing procedure we recommend for the efficient buying of

NUTS AND BOLTS...



YOUR INDUSTRIAL SUPPLY DISTRIBUTOR

No one is in a better position to give you what you want, when you want it than your industrial supply distributor. For all standard "stocked" Circle Ⓑ nuts and bolts, call him in. You'll make your purchasing more efficient by benefiting from his prompt, intelligent service.

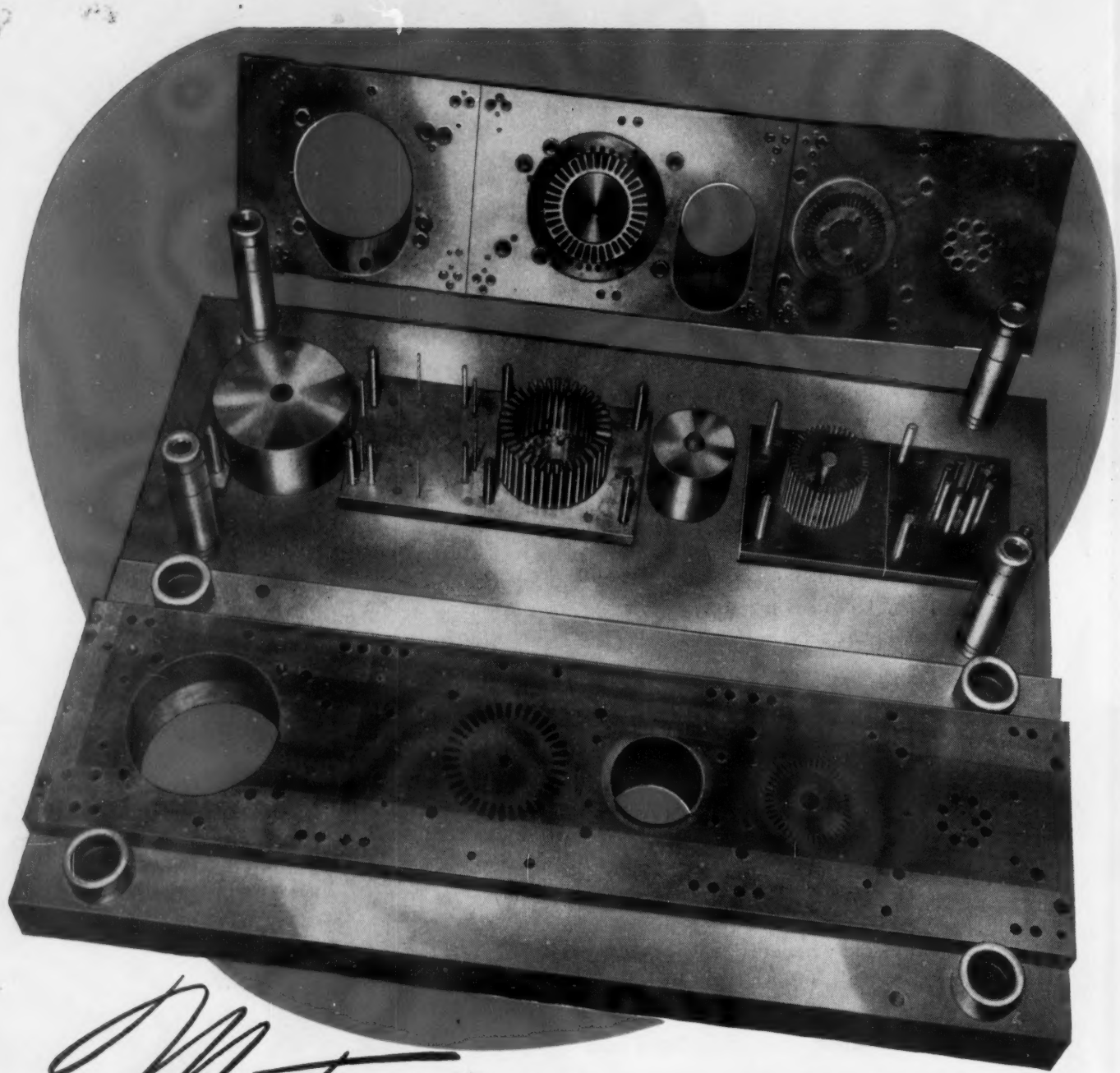
BUFFALO BOLT COMPANY REPRESENTATIVE

Your local Circle Ⓑ representative is the man to see whenever you wish to purchase specials, non-stock or production items. Remember his extensive personal experience in this highly specialized field is backed up by a rich background of manufacturing skill consisting of many years experience in producing nuts and bolts of all types *of which the uniform quality is controlled from billet to bolt in one single plant.*

BUFFALO BOLT COMPANY

NORTH TONAWANDA, N. Y. · SALES OFFICES IN PRINCIPAL CITIES

Export Sales Office: Buffalo International Corp., 50 Church Street, New York City



Masterpiece by CROMOVAN

100,000 pieces per grind . . . 100% increase in production over former dies . . . is the outstanding performance of this Cromovan six station, progressive lamination die. The die punches out both rotor and stator laminations complete . . . from .025 silicon lamination sheets . . . clearance tolerance of .0007 inch per side is strictly maintained between punches and die. All cutting surfaces of this die are made of CROMOVAN.

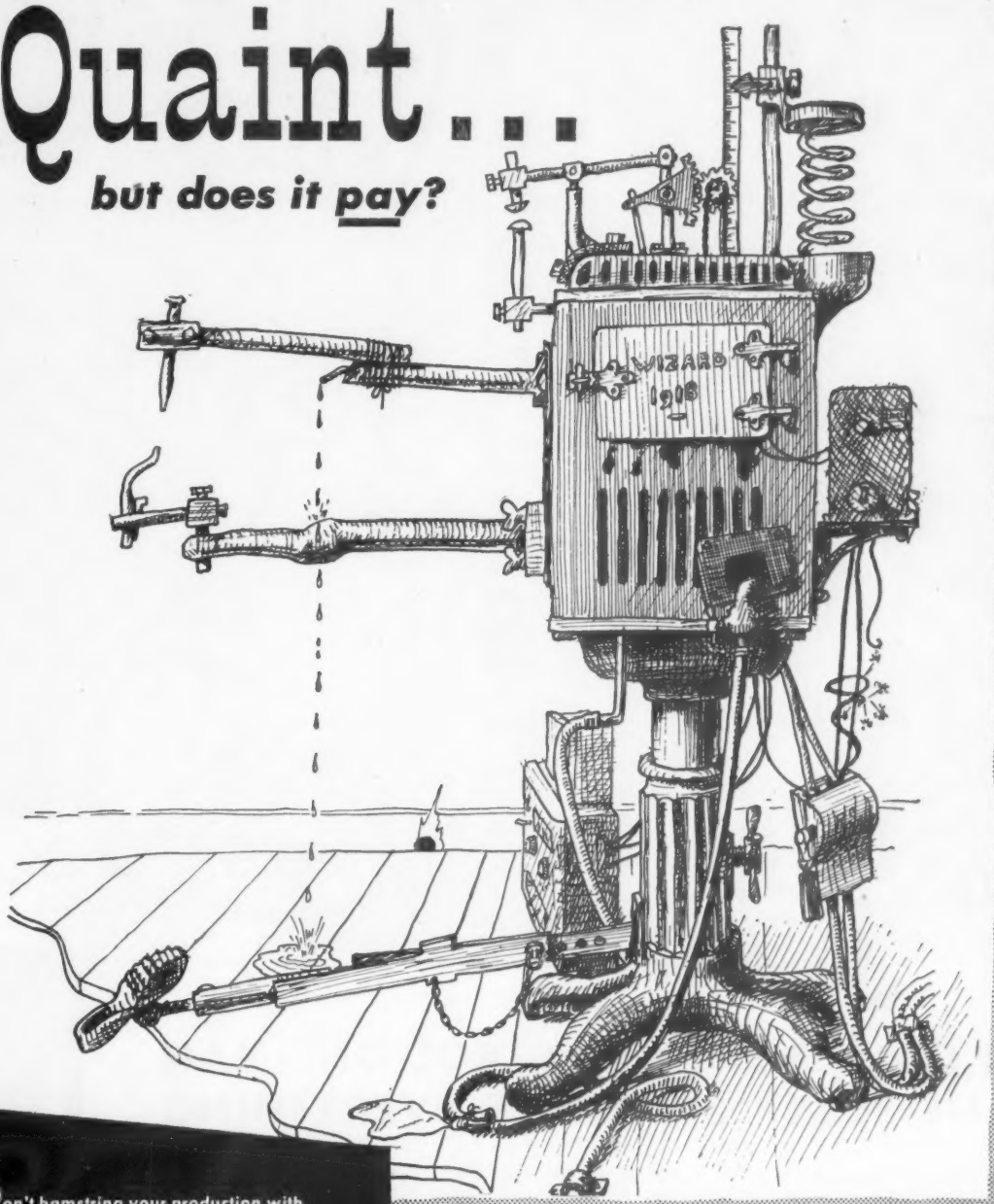
Call **Firth-Sterling**

STEEL COMPANY

McKEESPORT, PA. • NEW YORK • HARTFORD • PHILADELPHIA • PITTSBURGH • CLEVELAND • DAYTON • DETROIT • CHICAGO • LOS ANGELES

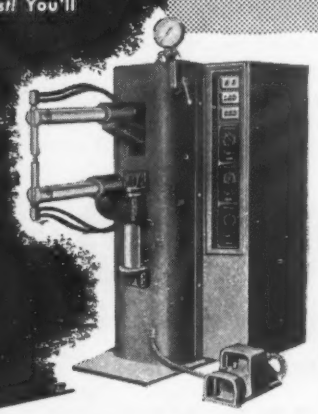
Quaint...

but does it pay?



Don't hamstring your production with out-of-date resistance welding equipment. Time and money spent on keeping ancient machines in operation, training operators, etc., is *lost!* You'll step up production . . . reduce man hours . . . stay ahead of competition with modern, completely automatic electronically controlled SCIAKY welders.

Sciaky has a complete line of standard spot, projection, portable, seam and flash welders that are *engineered for production.* We're specialists also in the design of "tailor-made" multiple gang welders. Write today for details.



If you're going to the Metal Show . . .

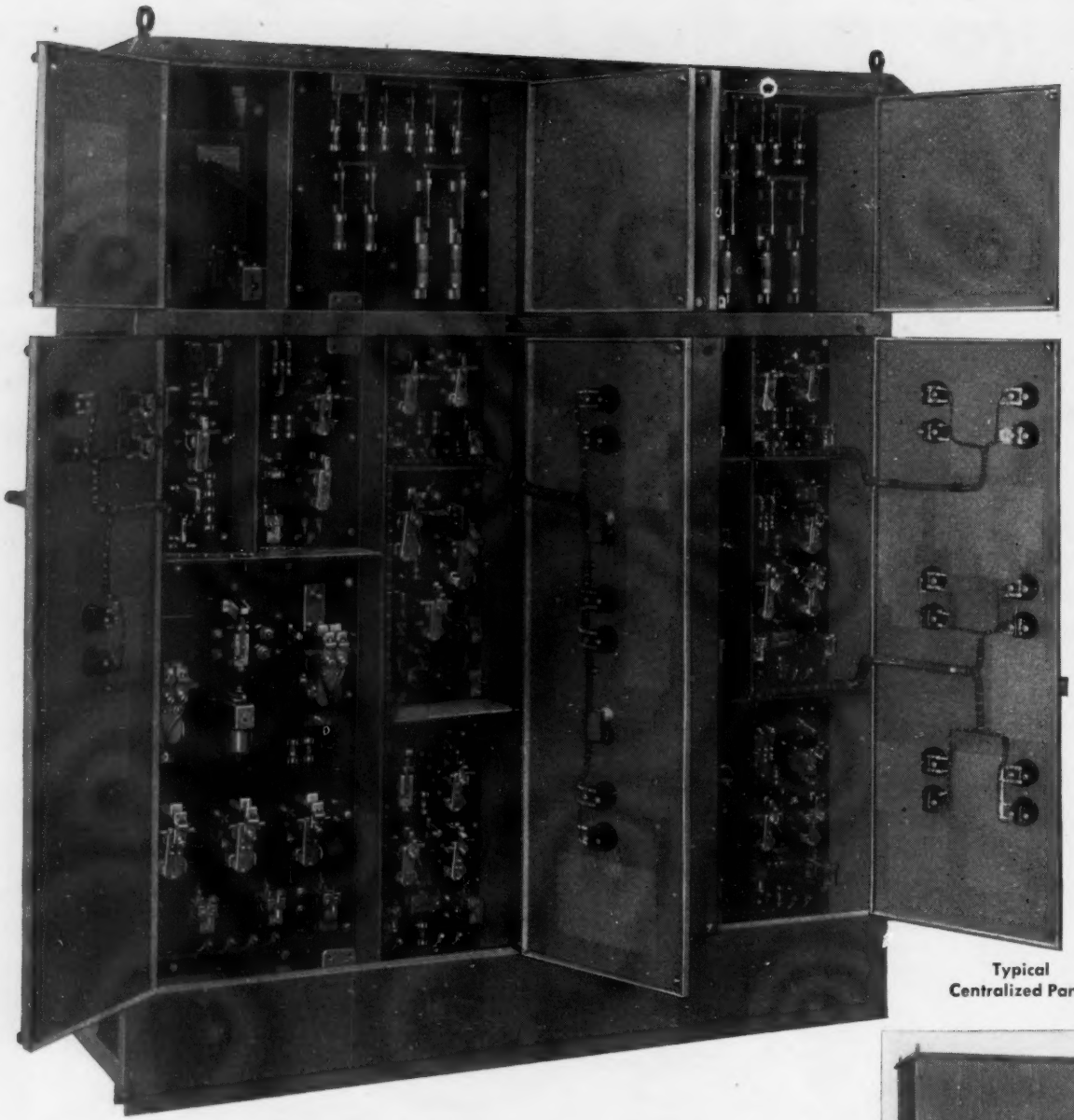
The latest Sciaky welders will be in operation at the National Metal Congress in Atlantic City, November 18 to 22. You are cordially invited to visit our booth E-220 in the Exhibit Hall.

SCIAKY BROS. Inc.

Offices and Representatives in Principal Cities

Plants in London and Paris

4927 W. 67th ST. CHICAGO 38, ILL.



Typical
Centralized Panel

WITH CENTRALIZED CONTROL ONE MAN IN ONE PLACE CONTROLS EVERYTHING

Convenience and accessibility of controls are but two of the many potent arguments for centralized control. Here are a few of the advantages:—

SAFETY of dead front enclosure with operation of all mechanisms from the front offers greatest protection to your operator.

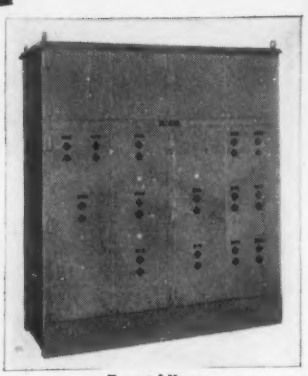
SIMPLICITY of installation and wiring results in reduced costs.

SPACE SAVING with the single enclosure is accomplished. Frameworks and wall supports are not needed.

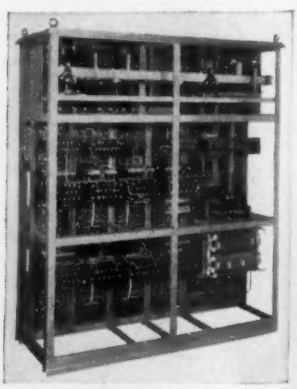
ENGINEERED CONTROL to meet your own requirements at little or nothing above the final cost of individual control units.

These are but a few of the reasons why alert engineers are specifying centralized control for modern plant installations.

Let us show you the benefits. A Ward Leonard engineer will gladly help you to select a centralized control to meet your exact needs.



Front View



Rear View

WARD LEONARD

RELAYS • RESISTORS • RHEOSTATS

Electric control devices since 1892

WARD LEONARD ELECTRIC COMPANY
65 SOUTH STREET, MOUNT VERNON, N.Y. • OFFICES IN PRINCIPAL CITIES

New equipment gets the right start

for a long life—

START your new machines and equipment out right—have a Gulf Lubrication Engineer "in the picture" just as soon as it's delivered.

This trained specialist will check over your machines and equipment, then recommend the proper oils and greases which will provide an extra margin of lubrication efficiency.

You will find that this progressive approach to effective lubrication results in better machine performance, less wear, lower maintenance costs, and extra years of useful life.

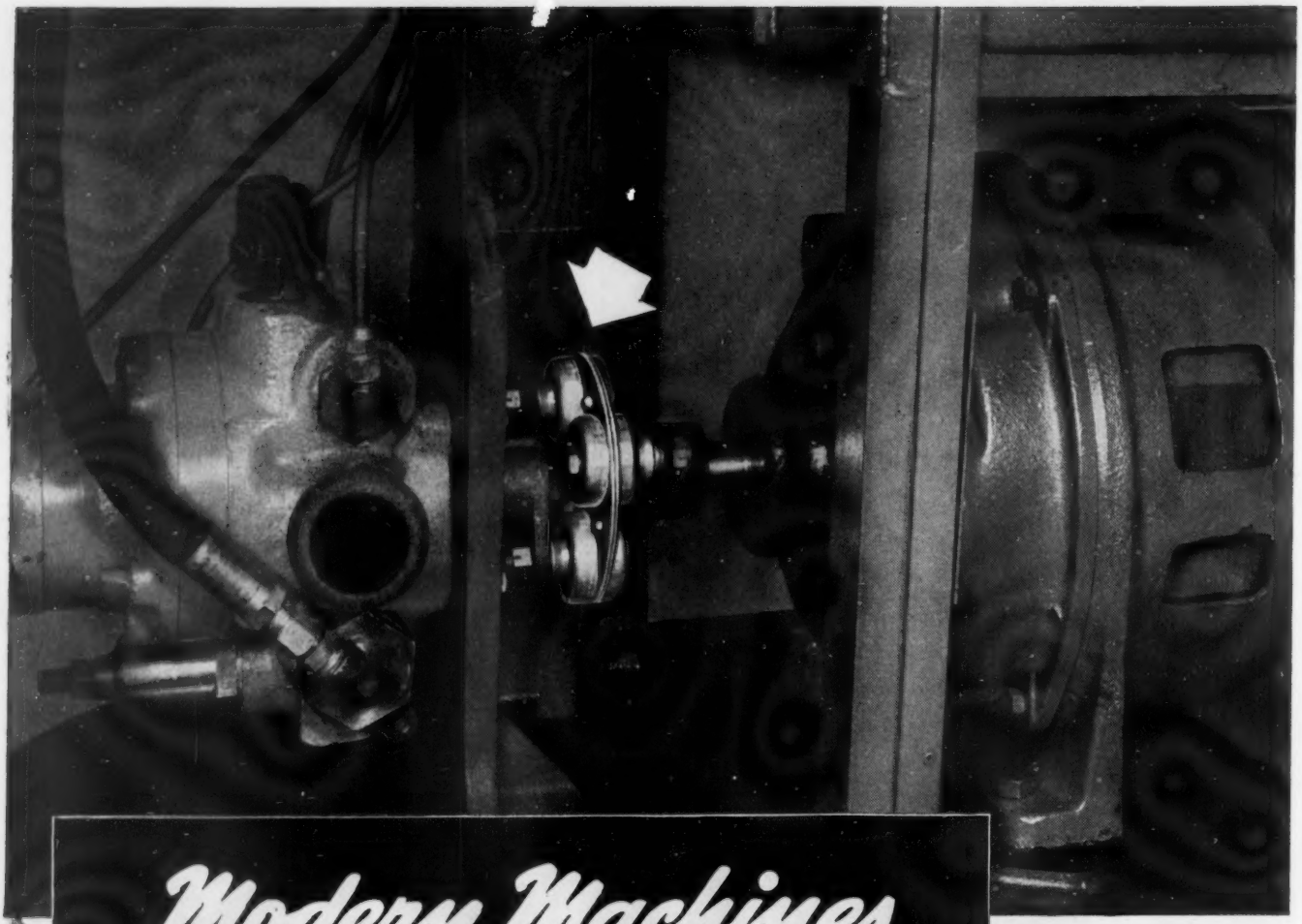
The helpful counsel of a Gulf Lubrication Engineer—and the Gulf line of more than 400 quality lubricants—are available to you in 30 states from Maine to New Mexico. Write, wire, or phone your nearest Gulf office today.

Gulf Oil Corporation • Gulf Refining Company, Gulf Building, Pittsburgh 30, Pa.

DIVISION SALES OFFICES: Boston • New York • Philadelphia • Pittsburgh • Atlanta • New Orleans • Houston • Louisville • Toledo

GULF INDUSTRIAL LUBRICATION

helps make machines
produce more at lower cost



Modern Machines Deserve MORFLEX Couplings

Chicago Pneumatic Tool Company's portable hydraulic system, adaptable to cold riveting, piercing, pressing and pulling operations, uses Morflex Couplings on the power unit shaft between motor and pump. Morflex Couplings absorb shock, vibration, prolong machine life in the severest service. MORSE CHAIN COMPANY, Detroit 8, Michigan; Ithaca, N. Y.

A PRODUCT OF B-W BORG-WARNER

MORSE ROLLER and SILENT CHAINS and COUPLINGS

N•B•M BABBITTS BOND TO YOUR BEARINGS

WITH A VISE-LIKE GRIP

All N-B-M Babbitt metals are expertly blended to bond easily and stick to their job tenaciously. They resist "squeezing out" even under the ponderous pressure of crushing loads.

It's a long time between rebabbittings when you standardize on virgin-alloyed

N•B•M BABBITT METALS

NATIONAL BEARING
DIVISION
ST. LOUIS • NEW YORK

AMERICAN Brake Shoe COMPANY

PLANTS IN: ST. LOUIS, MO. • PITTSBURGH, PA. • MEADVILLE, PA. • JERSEY CITY, N. J. • PORTSMOUTH, VA. • ST. PAUL, MINN. • CHICAGO, ILL.

WANTED:

JOBS TOO TOUGH FOR ORDINARY CORROSION-RESISTING COATINGS

ARE YOU LOOKING for a surface that will stand up under the most severe conditions? Then consider what thousands of satisfied users say about UCILON—that it offers *more* resistance to *more* corrosives for *longer* periods of time than any other surface material they have ever tried.

In a soap plant, for example, where ceilings are subjected to a dense fog of fatty acid vapors, UCILON-coated ceiling panels were still in excellent condition *after six months!* (Former coatings failed in as little as two weeks.)

In another case, UCILON was used in a tanker's hold, carrying 100-octane gasoline, diesel oil, kerosene, salt water ballast—and the hold was flushed with live steam before each change of cargo. Yet UCILON coatings were still in excellent condition *after ten months!* (No other coating used previously survived even one cargo.) And there are hundreds of similar cases on record.

Have you a really tough coating job to be done? If you have—we want it. For we believe that UCILON will outlast any finish you have ever tried. Write today for complete details.

WHAT IS UCILON?

UCILON is a surface coating material formulated from new and improved inert synthetic resins. It is air drying and can be applied to any metal, wood, or concrete surface by brushing, spraying or dipping. Upon evaporation of the solvent, a hard, durable "plastic" coating is formed.

UCILON is remarkably resistant to acids, alkalies, salts, alcohols, oils, water, cleaning compounds, and industrial oxidants. It has excellent flexibility, toughness, adhesion—and no taste or odor when dry. It is non-toxic, fungus-inhibiting, has good electrical resistance, and gives an attractive glossy finish.

UNICHROME

UNITED CHROMIUM, INCORPORATED

PROCESSES AND MATERIALS

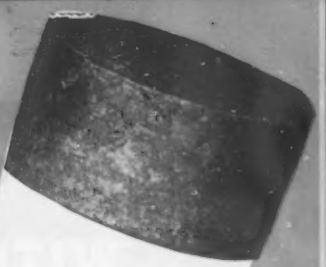
FOR SURFACES THAT SURVIVE

Chromium Plating • Porous Chromium • Unichrome* Copper
Unichrome Lacquers • Ucilon* Protective Coatings
Unichrome Stop-Off Lacquers and Compounds • Unichrome Dips
Unichrome Rack Coatings • Anozinc* Compounds • Unichrome Strip

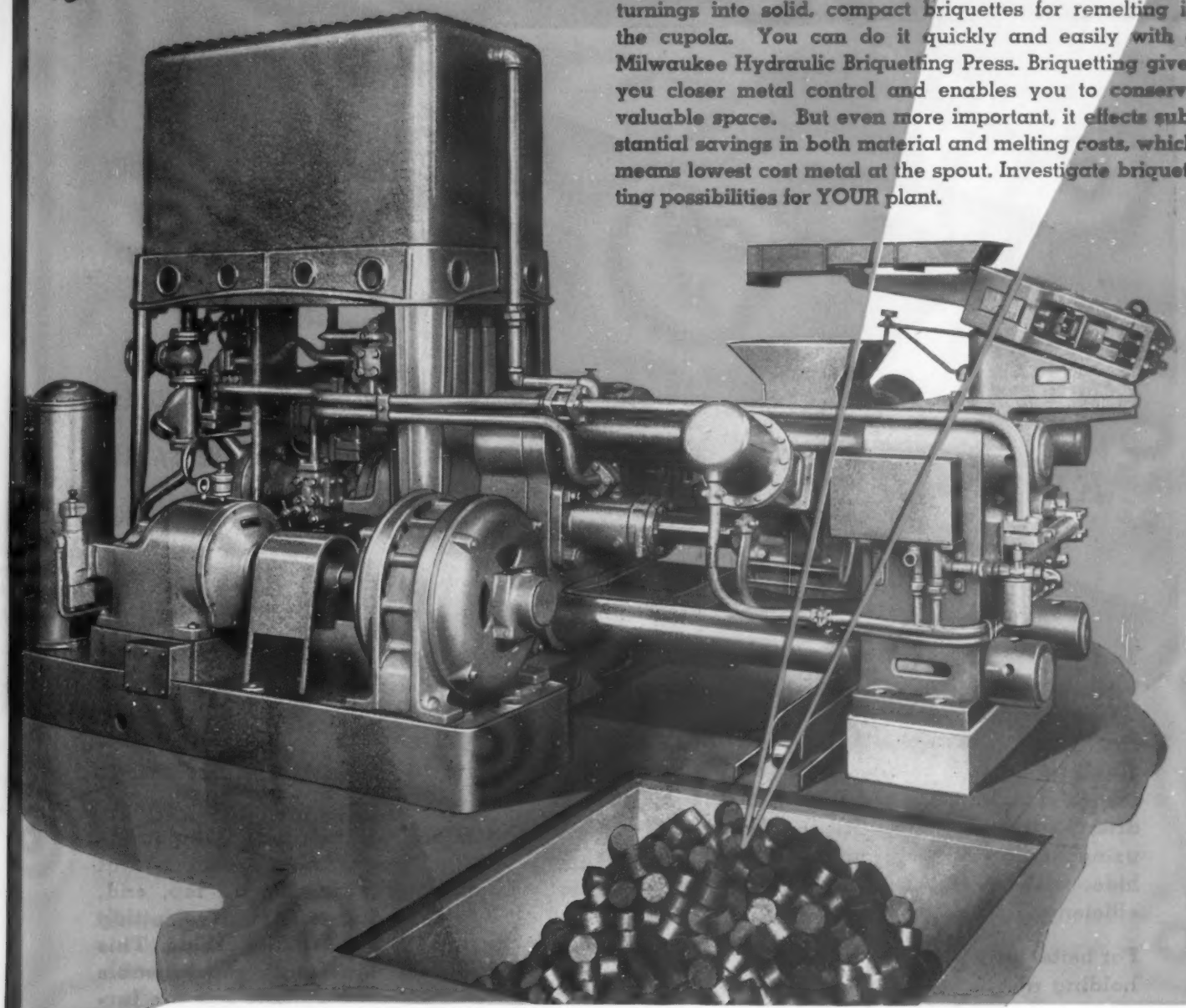
*Trade Mark Reg. U. S. Pat. Off.

51 East 42nd St., New York 17, N. Y. • Detroit 7, Mich. • Waterbury 90, Conn. • Chicago 4, Ill. • Dayton 2, Ohio • Los Angeles 11, Cal.

BRIQUETTE...
to conserve resources



It pays to convert bulky, space-consuming borings and turnings into solid, compact briquettes for remelting in the cupola. You can do it quickly and easily with a Milwaukee Hydraulic Briquetting Press. Briquetting gives you closer metal control and enables you to conserve valuable space. But even more important, it effects substantial savings in both material and melting costs, which means lowest cost metal at the spout. Investigate briquetting possibilities for YOUR plant.



The Machine Pays for Itself! Briquettes produced with a Milwaukee Hydraulic Briquetting Press act like solid blocks of metal of identical size and weight. They melt readily, with practically no loss whatsoever. Aside from serving as a conservation measure, the briquetting process pays for itself in the greater amount of scrap metal salvaged from borings and turnings in the plant. Also of importance is the space and labor saving factor . . . the tremendous bulk of borings and turnings is reduced by briquetting to a uniform and convenient size for handling readily and without breakage.

Check Your Tonnage! Why not check your annual tonnage of metal borings and turnings to determine the possibility of salvaging it economically. Milwaukee engineers will gladly make available to you, for the asking, a vast store of knowledge and experience in solving your chip reclamation problems. Write today for Bulletin 117 giving complete details.

MILWAUKEE *Foundry Equipment Co.*

3238 W. PIERCE STREET, MILWAUKEE 4, WISCONSIN, U.S.A.

CUT COSTS—SPEED PRODUCTION WITH *SUPER* EJECTOR-TYPE TOOLS*

MACHINES **ANY** METAL

SOLID CARBIDE REPLACEABLE BITS

- OUTSTANDING DESIGN FEATURES
- ECONOMICAL • FAST • VERSATILE
- EASY GRIND • SUPERIOR CUTTING PERFORMANCE

You cut costs . . . you increase efficiency when you use Super Ejector-Type Tools for Carbide machining applications. Tests prove heat concentration is reduced—thermal checking almost totally eliminated. This means extra long life and higher production after sharpening . . . frequently permits using harder-than-ordinary grades of Carbide, with correspondingly higher cutting efficiency.

For better chip flow—smoother cuts, the bit-holding mechanism is inside . . . where it can't interfere with chips or assembly of tool in tool block. Well-supported replaceable Carbide bits are extra long and extra sturdy and take deep cuts with safety. Since the bit is mechanically held, there are no destructive brazing strains to weaken the tip.

Tool cost is sharply reduced! Compound-angles of the ejector mechanism permit feather-light regrinding cuts on top, end, and side and produce sharp, new cutting edge with minimum loss of Carbide. This versatile tool machines *any* machineable material. Replaceable Carbide bits are furnished in proper grade for each job. See your dealer or write for further information.

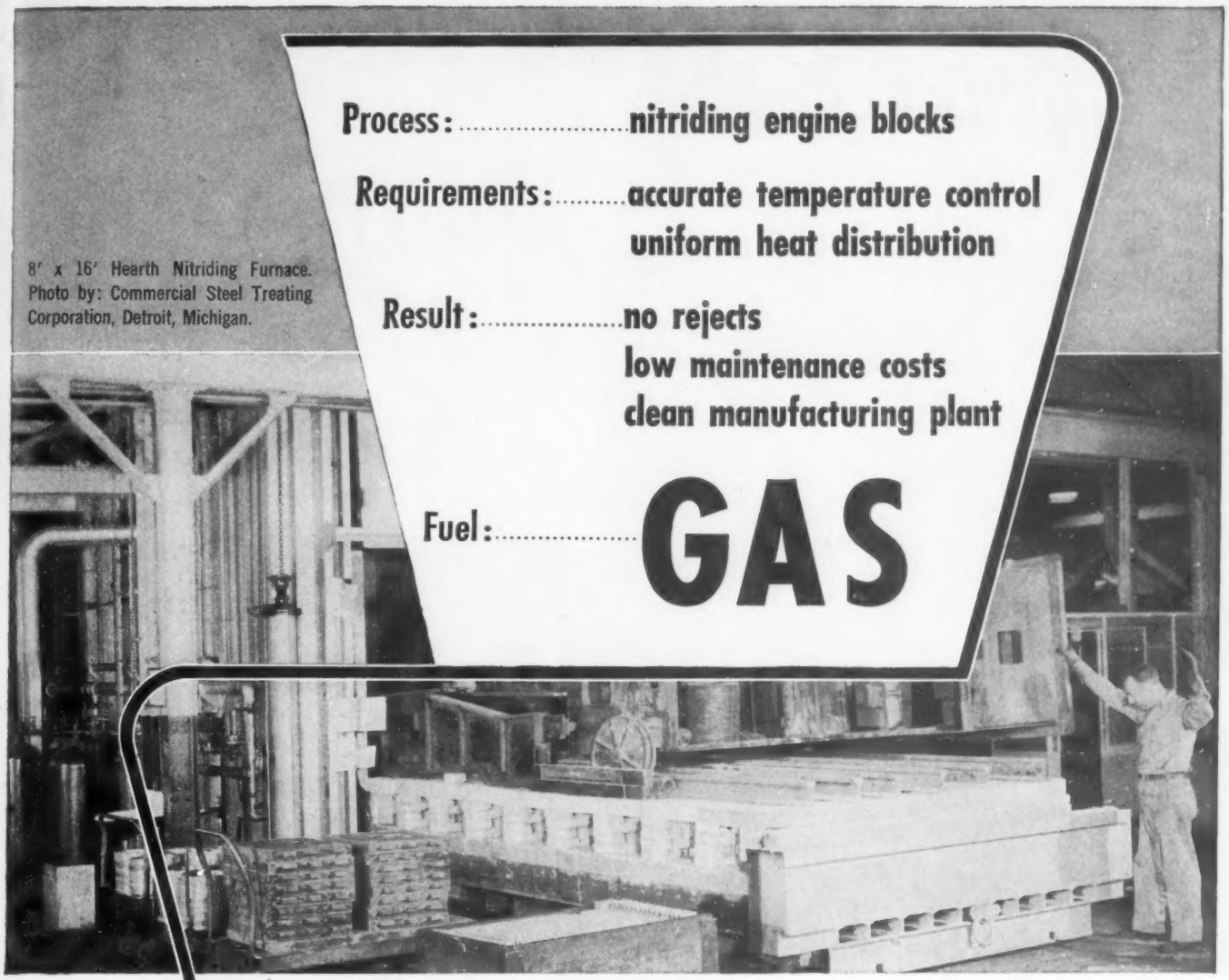
*PATENTS PENDING

See this tool demonstrated at space No. A-129, National Metal Exposition, Atlantic City, New Jersey, November 18 to 22.

SUPER TOOL COMPANY

Carbide Tipped Tools

21650 Hoover Rd., Detroit 13, Mich. 4105 San Fernando Rd., Glendale 4, Cal.



8′ x 16′ Hearth Nitriding Furnace. Photo by: Commercial Steel Treating Corporation, Detroit, Michigan.

Process: ..... **nitriding engine blocks**

Requirements: ..... **accurate temperature control**
uniform heat distribution

Result: ..... **no rejects**
low maintenance costs
clean manufacturing plant

Fuel: ..... **GAS**

Capacity and product specifications for the GAS-fired furnace include:

- **Temperature** ..... **975 degrees F.**
- **Allowable Variation** ..... **±5 degrees F.**
- **Process Time** ..... **96 hours**
- **Case Depth** ..... **0.025 inches**
- **Atmosphere Supply** ..... **Ammonia**
- **Production Rate** ..... **200 Tons per Month**

Commercial Steel Treating Corporation demands accurate temperature control and uniform heat throughout the chamber of its heavy-duty nitriding furnace. GAS fulfills these requirements; five years of successful operation supply the proof.

GAS, dependable fuel for industrial processing operations, meets the most exacting control and heating requirements. Low maintenance costs and cleanliness characterize GAS-fired installations.

You will want to study facts and figures on the use of GAS in your construction or modernization planning. The Industrial Representative of your local Gas Company has a wealth of useful information. He's as near as your telephone; he knows the answers.

Visit the A.G.A. Combined Exhibit of
INDUSTRIAL GAS EQUIPMENT
17TH NATIONAL POWER SHOW
Grand Central Palace • New York City • December 2-7

AMERICAN GAS ASSOCIATION
420 LEXINGTON AVENUE, NEW YORK 17, N.Y.

MORE AND MORE...
THE TREND IS TO GAS
FOR ALL INDUSTRIAL HEATING

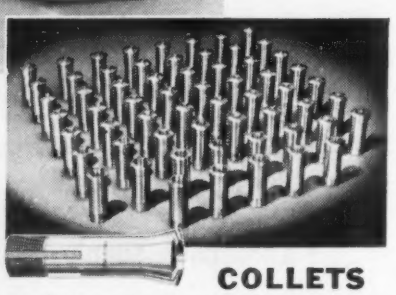
TO INSURE ACCURACY, USE—

SOUTH BEND *Precision* LATHES

South Bend Lathes help to increase plant efficiency and profits by raising precision standards both in the toolroom and in the production shop.

These lathes are designed and built to work to close tolerances and produce a smooth finish, for ease and speed of operation, and to give long, dependable service. Versatile, too, they are capable of performing a wide variety of operations on all types of machinable materials with a minimum of change-over and set-up time. Attachments are available which help to simplify and speed tooling for special classes of work, and in many instances eliminate the need for special fixtures.

South Bend Engine Lathes and Toolroom Lathes are made with 9", 10", 13", 14½", and 16" swings, bed lengths to 12', and collet capacities to 1". Precision Turret Lathes are made with collet capacities to ½" and 1". Write today for Catalog 100-D which illustrates and describes the complete line of lathes and accessories.



COLLETS

Equip Your Lathes with Complete Sets

A complete set of collets is especially helpful for toolroom and maintenance work. Often the time saved in getting out a single rush job without having to wait for a specially ordered collet will more than compensate for the cost of a full set of collets.

South Bend Collets are made in four types, and are available in either steel or brass. Each collet is carefully inspected and tested before it is packed for shipment.

SOUTH BEND LATHE WORKS

429 EAST MADISON STREET • • • SOUTH BEND 22, INDIANA

LATHE BUILDERS SINCE 1906

Wire ahead!

to keep in step

HERE is a picture of what *can't* happen if the split-second coordination, for which automobile plants are famous, is to prevail.

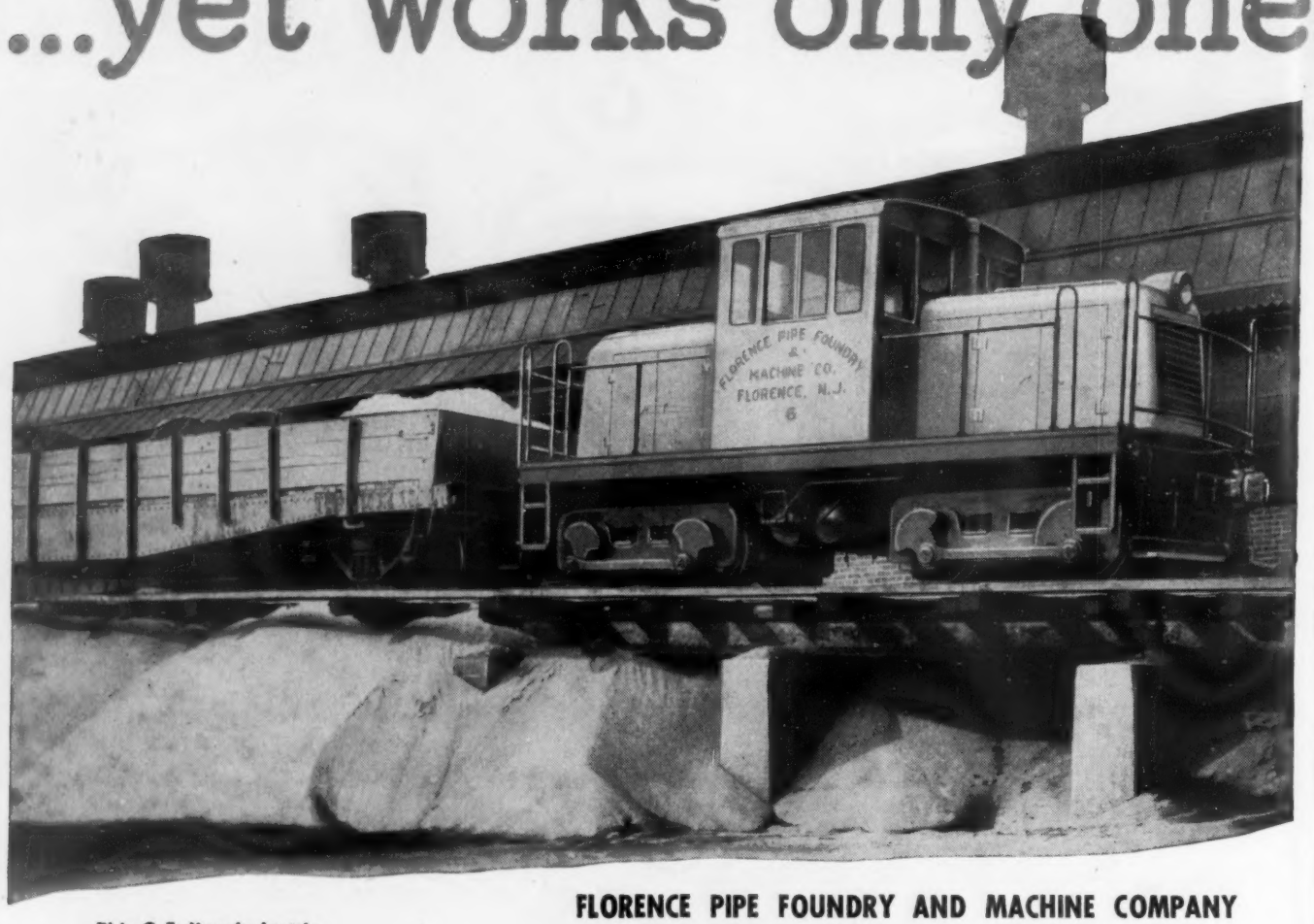
But it can happen, and it *will* happen in any plant without adequate wiring. For, when obsolete wiring, overtaxed wiring, over-extended wiring can reduce the efficiency of man and machine by 25 to 50 per cent, production is reduced accordingly. With lost production, you can't keep in step with competition.

It may pay you to check on your wiring at once. Ask your plant power engineer, consulting engineer, electrical contractor or power salesman. A wiring survey now may save costly shut-downs and expensive alterations later. 46220

ANACONDA

ANACONDA WIRE & CABLE CO.

G-E diesel-electrics ...yet works only one s



This G-E diesel-electric handles all switching and hauling at Florence plant.

FLORENCE PIPE FOUNDRY AND MACHINE COMPANY IS PROFITING WITH G-E DIESEL-ELECTRICS

Advantages of G-E diesel-electrics

Availability 90 per cent up.

Fuel costs only fraction of that of steam locomotive.

Operates several days without refueling.

Maintenance expense is greatly reduced.

Ideal for use around buildings because it gives off no smoke nor harmful exhaust gas.

Smooth, even torque at driving wheel rims is easy on track.

Florence Pipe operating results for first six months

Diesel-electric has nearly 100 per-cent availability.

Fuel costs average $23.71 a month against $160.00 for steamer.

Fueling time cut 87 per cent.

Maintenance costs reduced 88 per cent.

Diesel-electric is used in machine shop, with no employee complaints.

Marked reduction in track maintenance expense.

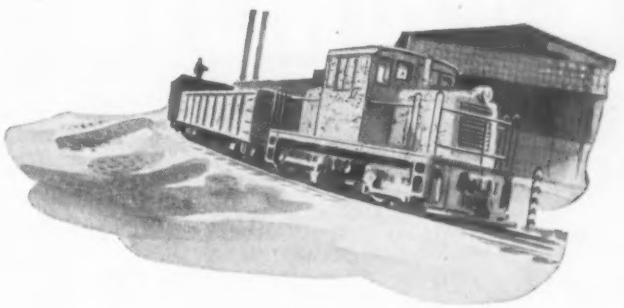
GE

diesel-electric *Industrial* LOCOMOTIVES

A standard line—built for stock—quick delivery—low cost

saves $400 a month

shift a day



A 45-ton G-E diesel-electric replaced a 55-ton steam locomotive last July at the Florence Pipe Foundry & Machine Co., Florence, N. J. In the diesel-electric's first six months of service, the company's records show a saving of over $2400 in operating costs alone, or at the rate of nearly 20 per cent per year on the purchase price!

The diesel-electric switches all incoming and outgoing railway cars, and handles intra-plant movement of raw materials and finished products. In addition it hauls slag to the dump two miles away, readily pulling twelve cars of slag, weighing 35 to 40 tons each, up a two per-cent grade. It easily pushes 80-ton loads of sand or coke to the loading trestle, the approach to which combines an eight per-cent grade with a 400-foot radius curve.

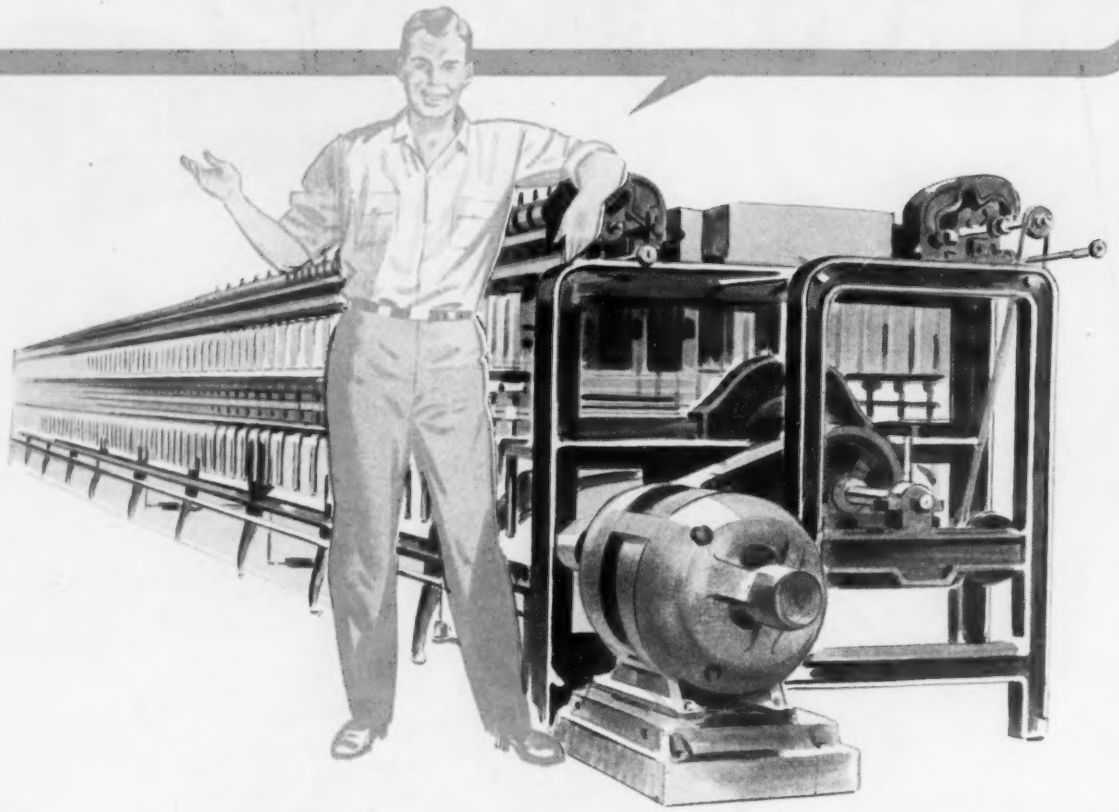
The diesel-electric requires but one half-hour a week for inspection and oiling. Except for this, it has had 100-per-cent availability, as compared with five or six hours per week required for the steamer.

Your switching and haulage operations may be different from those at Florence, but one of the five standard sizes of G-E diesel-electrics will meet your needs just as efficiently and economically. Why not have a G-E engineer make a survey of your particular requirements and submit cost data?

GENERAL ELECTRIC

120-24-9505

"I want to be sure Magnesium will stand the gaff"



Right you are, Mr. Plant Operator, in wanting assurance that the magnesium going into your machinery and equipment can take the punishment you'll give it. Here's a sample of such evidence—

You saw magnesium "take bumps a'plenty" during the war. Planes used millions of pounds of American Magnesium products where dependability was paramount.

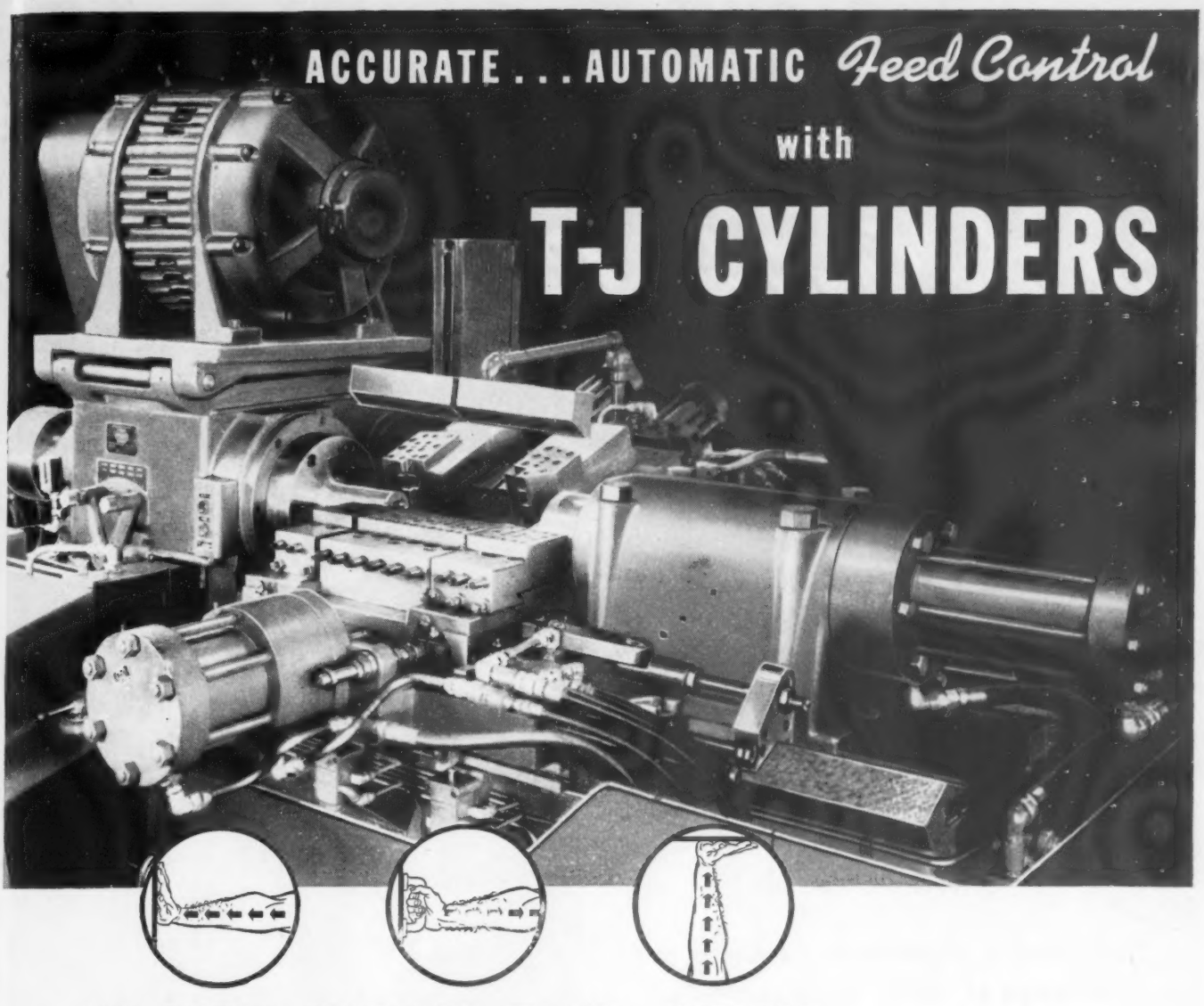
At home, in industry, high-speed knitting machines turned out greater quantities of materials because of their lightweight American Magnesium parts. Wrapping machines, food preparation equipment, and the like, with magnesium parts—all stood the terrific strain of day and night operation throughout the war years. And they're still going strong.

Yes, magnesium can take it. So, if you're interested in speeding up your equipment by incorporating this efficient, dependable weight saver, get in touch with the nearby Alcoa office. Or write ALUMINUM COMPANY OF AMERICA, Sales Agent for American Magnesium Products, 1721 Gulf Building, Pittsburgh 19, Penna.

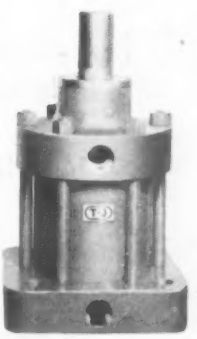
MAGNESIUM MAZLO PRODUCTS

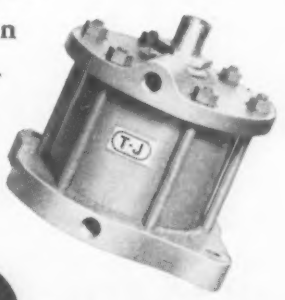
REG. U. S. PAT. OFF.

AMERICAN MAGNESIUM CORPORATION
SUBSIDIARY OF
ALUMINUM COMPANY OF AMERICA



FOR POWER MOVEMENT IN ANY DIRECTION





T-J Cylinders on this Sparks Hydra-Feed Lathe furnish automatic and accurate control for feeding the work to cutters in this multiple tooling set-up.

Another tough job—and T-J Cylinders do it *right!*

More and more today in industries throughout the nation . . . T-J Air and Hydraulic Cylinders are used to simplify operations and save time and labor. For pushing . . . pulling . . . lifting . . . clamping . . . 100 lbs. or 50,000 lbs. Available in many standard sizes and styles . . . both cushioned and non-cushioned types. Backed by 29 years' experience . . . T-J engineered to do the job *better* and *cut costs!* Write for latest catalogs. The Tomkins-Johnson Co., Jackson, Mich.

TOMKINS-JOHNSON

RIVITORS...AIR AND HYDRAULIC CYLINDERS...CUTTERS...CLINCHORS

T-J

MICROHONING

is the Quicker, Better, Lower-Cost Method

A DIESEL FUEL INJECTOR BODY
.375" DIAMETER x 2½" LONG

1st Honing Operation—in the "green" —Removes an average of .012" in 65 seconds.

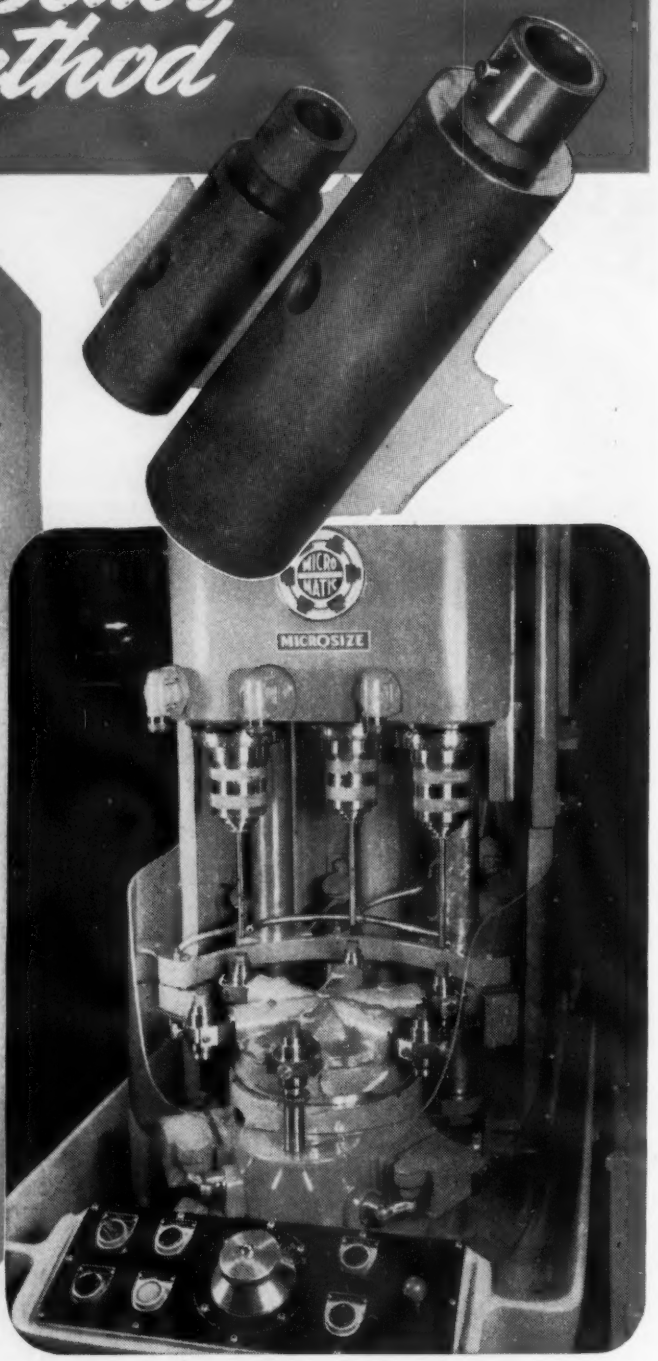
Part is then Nitrided to 70-72 Rockwell C.

2nd Honing Operation Removes an average of .0015" in 60 seconds.

Roundness and taper is held within .0001".

Bow is held within .00007".

Microhoning speeds operation in final machining of either green or hardened parts.



MICROMATIC HONE CORPORATION • DETROIT 4, MICHIGAN

DISTRICT FIELD OFFICES: 1323 S. Santa Fe, Los Angeles 21, Cal. • 194 Dalhousie St., Brantford, Ont., Can. • 616 Empire Bldg., 206 S. Main St., Rockford, Ill. 501 Harries Bldg., 137 No. Main St., Dayton 2, Ohio • 927 A—M & M Bldg., P.O. Box 981, Houston 2, Texas • Room 514—129 Church St., New Haven 10, Conn.

UNION PACIFIC RAILROAD SERVES SUN VALLEY

Re-opens December 21st

Sun Valley · Idaho

Its war duty as a Navy rehabilitation center ended, America's famous year 'round sports resort invites you to enjoy a winter vacation in Idaho's Sawtooth Mountains.

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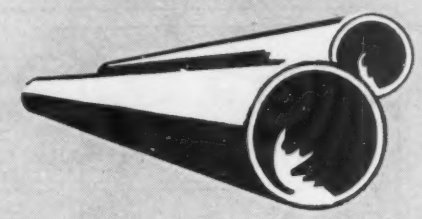

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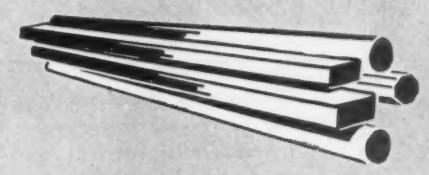

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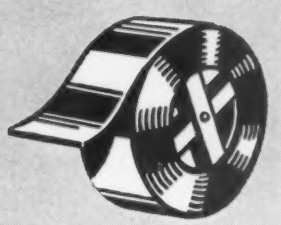

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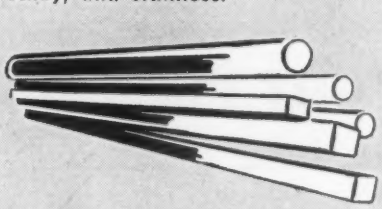

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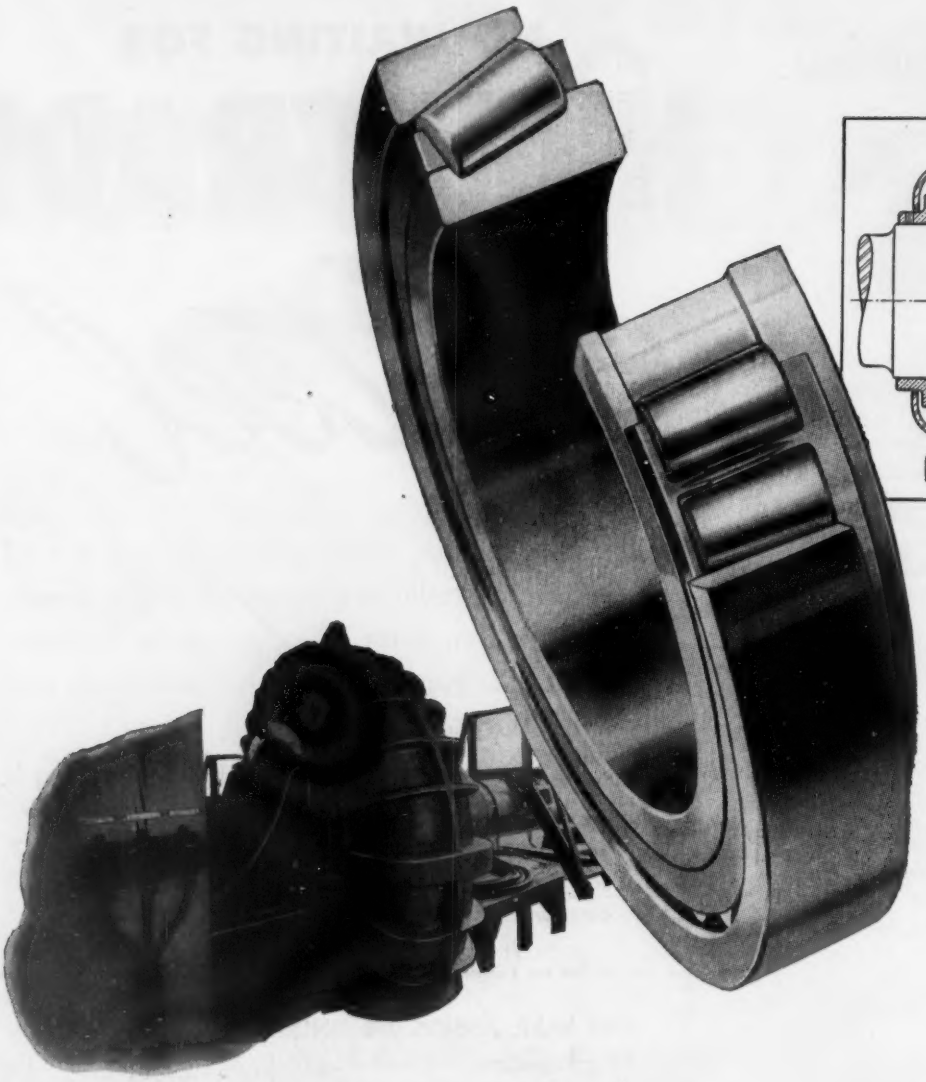

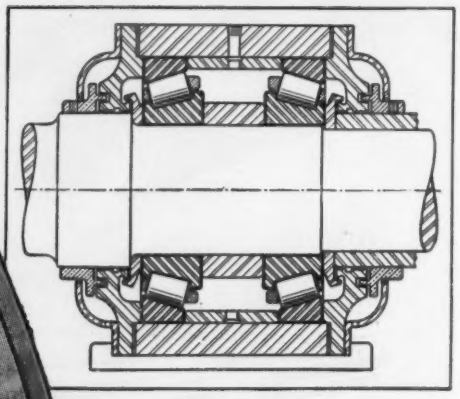

Cross-section shows two of the Torrington single-row tapered roller bearings as used at the Fort Peck Dam in the 28" Bucyrus-Erie Dredge Pumps.

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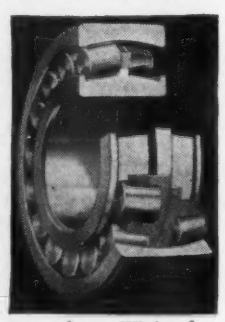

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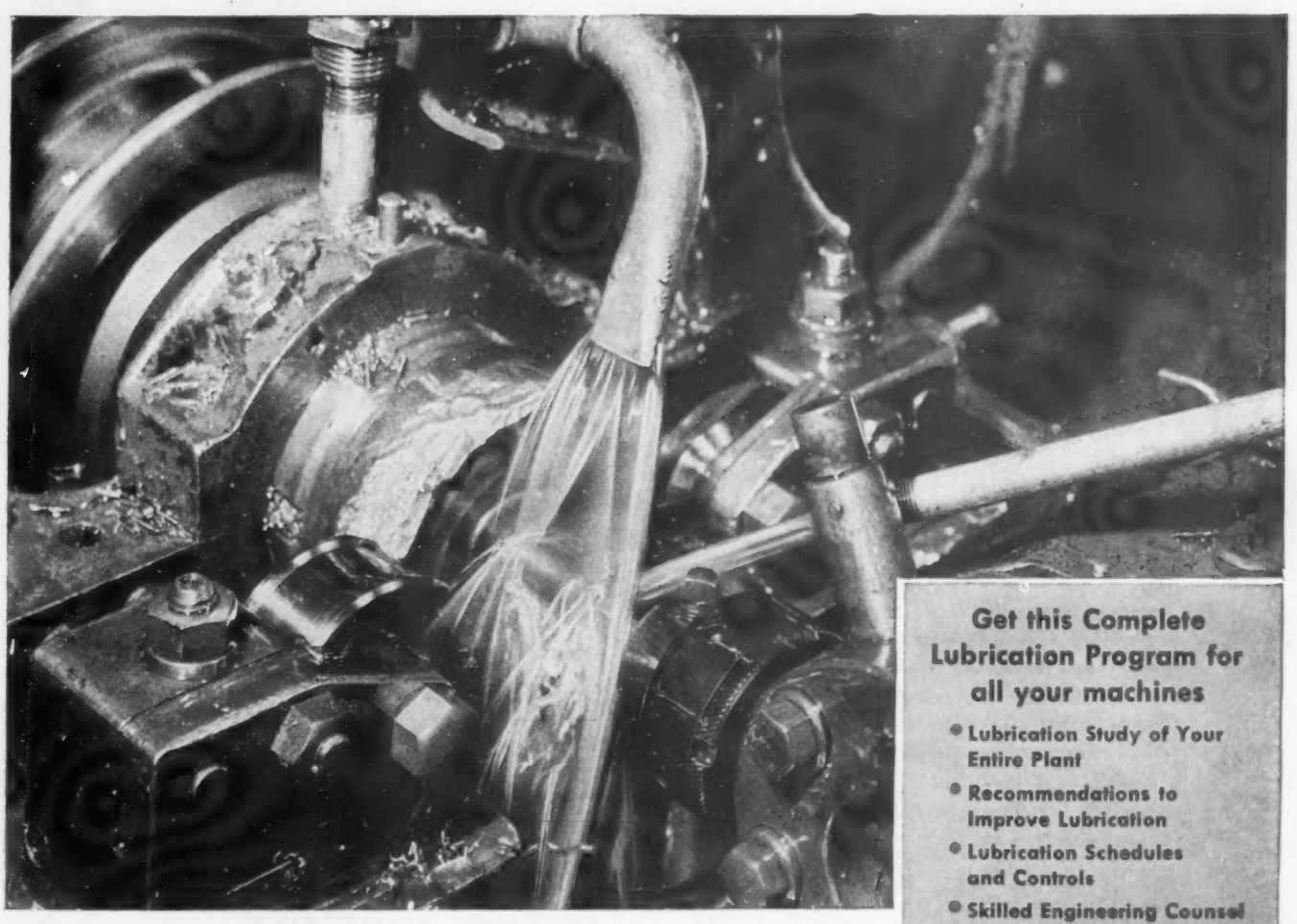

S/V Sultran B40 used in drilling and reaming operation on Brown & Sharp Automatic. SAE 1020 steel; speed 145 s. f. m., .001" tolerance on hole. Feed: .004" on drill, .006" on reamer. 34 seconds cycle time. Tool life 8 hours.

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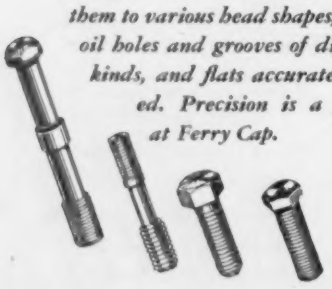

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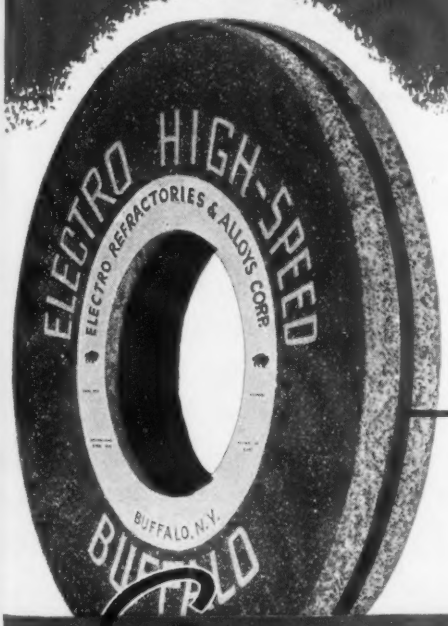

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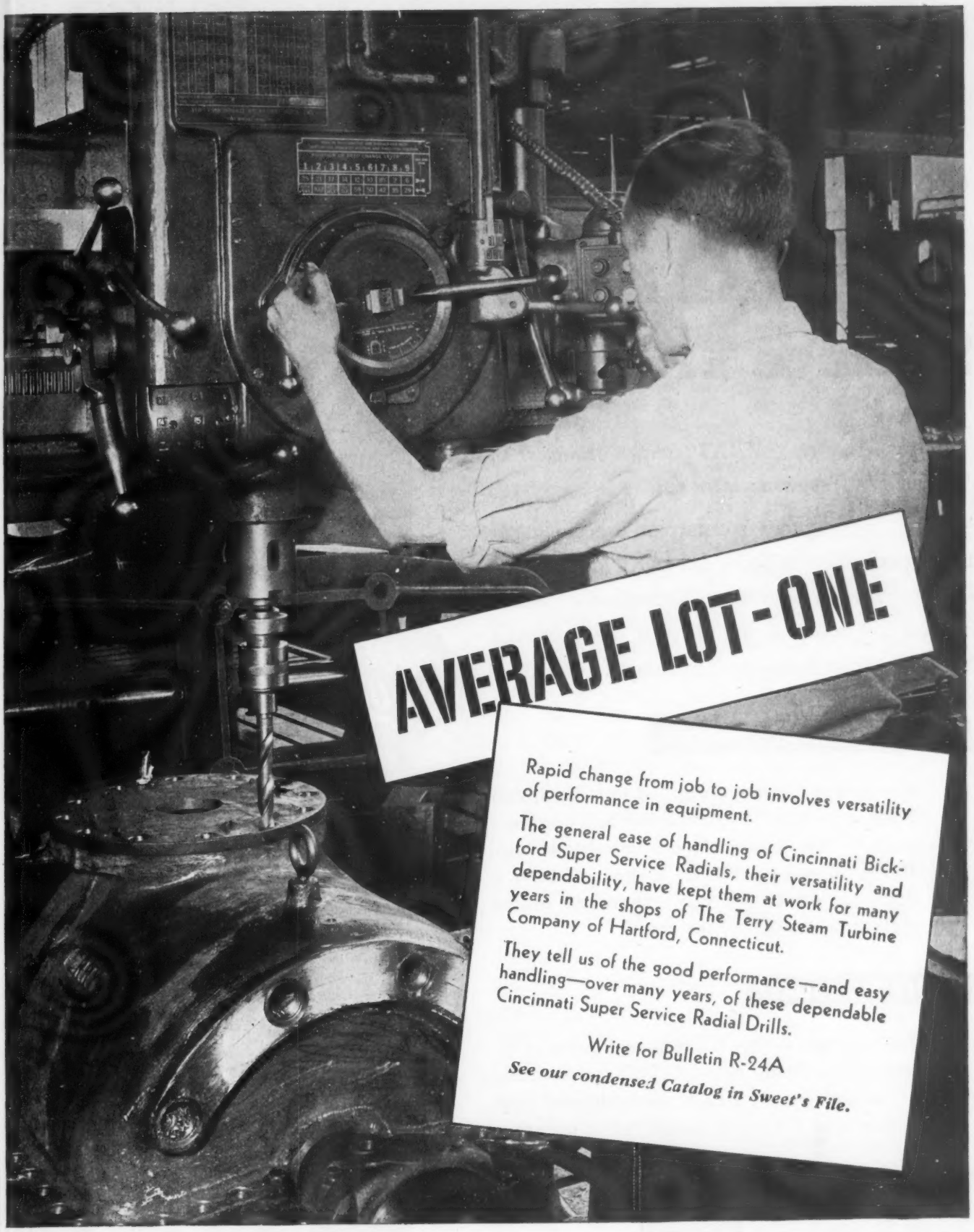
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STEEL

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VOL. 119, NO. 20 NOVEMBER 11, 1946

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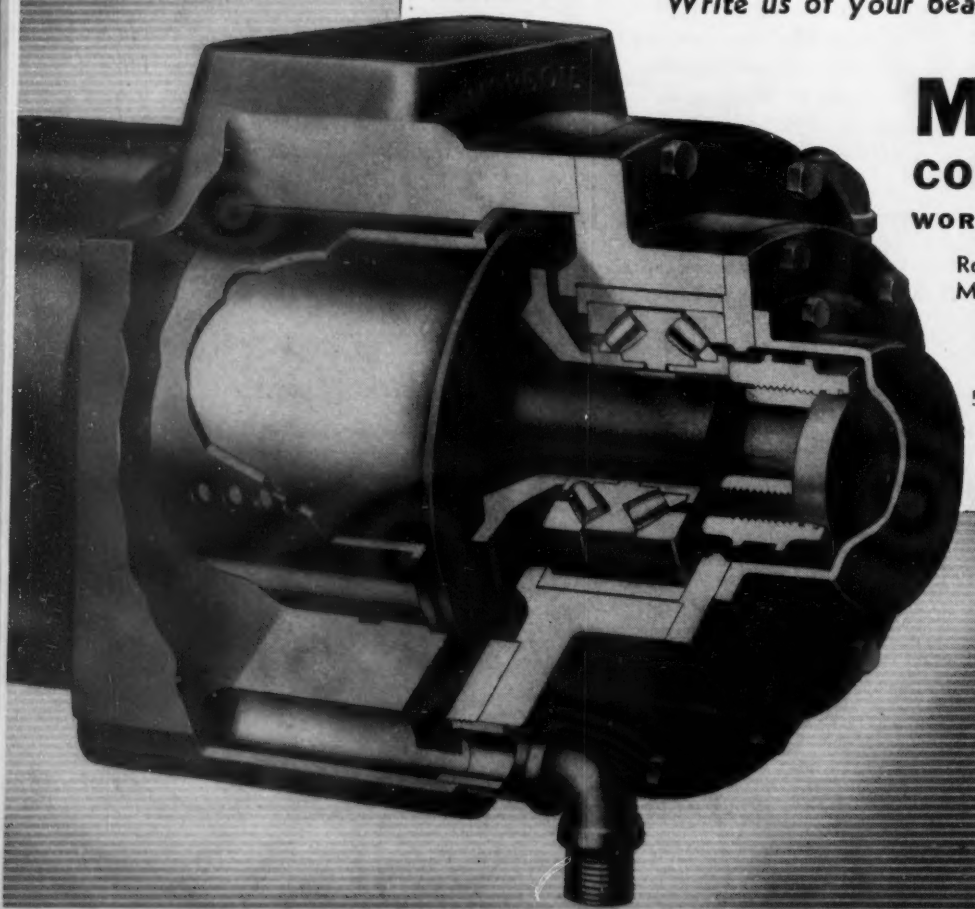

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As the EDITOR VIEWS the NEWS

Green Light for Progress

Throughout the country are thousands of industrialists who are elated because last Tuesday's election demonstrated that a majority of American citizens finally have discovered flaws in the government's administration that have been apparent to most men in industry for a decade or more. To countless conscientious businessmen, many of whom have felt for years that they were scapegoats in the eyes of the public, the action of the voters last Tuesday comes as a welcome relief. It is good to feel that one is with the majority—particularly when the majority is right.

However, whatever gratification industrialists may enjoy as a result of the election should be tempered by a new sense of responsibility. That at long last the tide has turned can be capitalized for the good of the nation only to the extent that the people's will can be translated into terms of better legislation and more able government administration. The initial challenge of the election is to the new Senators and Congressmen who have been swept into office to interpret the voice of the people accurately and to see that they are given the kind of government they want.

Industry's responsibility lies in the field of its relations with the government and with the public. Industrialists will make a grave mistake if they interpret the vote of last Tuesday to mean that the people wish to return to the conditions that existed before the New Deal party came into being. Industry will be wise if it interprets the vote to mean that the people want to retain that which was good in New Deal reforms and to throw out only that which was oppressive, futile and destructive.

To all who contributed to the great corrective gesture of Nov. 5 now falls the responsibility of supporting constructive leadership. The vote was largely a vote of protest. To stop a destructive trend is important, but it does not necessarily mean progress. If we are to capitalize upon last Tuesday's victory, we must start immediately to work for forward-looking policies that will lead the country out of its present difficulties as rapidly as possible.

With this objective in mind, industry, in company with all constructive elements in the nation, should drop its negative and defensive role and adopt immediately a positive, offensive drive for progress in reconversion. Buoyed by the proper spirit all along the line, this nation can lift itself out of the doldrums in a surprisingly short time.

SHOESTRING FORMULA: Acquisition of control of Mahoning Valley Steel Co. by General Electric Co. to assure itself of adequate supplies of flat-rolled steel is significant for several reasons.

First, it is one of a growing list of transactions by which fabricators or manufacturers have purchased or leased facilities to insure a continuous supply of hard-to-get materials. Secondly, Mahoning Valley was one of the last few nonintegrated sheet steel producers to survive the powerful squeeze of adverse developments during the past decade. Thirdly, this latest of a series of extraordinary industrial expedients points unerringly to the fact that the late unlamented New Deal, while unmatched throughout history in its ardent lip service on behalf of the rights of small business, actually has done more to destroy opportunities for modest business enterprises than any other influence operating in the field of American industry in recent years.

This nation became strong because men with ideas and courage could start in business on a shoestring.

(OVER)

Some fail, some survive and a few become large. This process is fundamental. We should protect it.

After all, an American industry consisting only of gigantic corporations must be an industry severely regulated by government. An industry in which abundant opportunities are open to small aspirants requires less regulation by government and affords greater freedom for all businesses. —p. 110

° ° °

PROFIT-WAGE-PRICE: Improved earnings in the third quarter for 21 steel ingot producers brought their net profits for the first nine months of 1946 to almost $165 million, compared with about $119 million in the corresponding period in 1945. National City Bank of New York reports that increased earnings for 350 industrial corporations in the third quarter brought their net profit for nine months in 1946 to a point 12 per cent above net in the same period last year.

This improvement in the July-September quarter —due to good volume, high prices and fewer strikes —should not be viewed too optimistically. Nonrecurring credits and lower taxes were factors. Ratio of profit to investment and to gross sales is not impressive.

We like the comment of Eugene Grace of Bethlehem: Even if it could be proved that the steel industry can pay higher wages on the basis of present prices, he would favor decreasing prices rather than increasing wages as better for the country's economy. —pp. 109, 111, 113

° ° °

28TH METAL CONGRESS: During the week beginning Nov. 18 a large portion of the personnel responsible for technological progress in the iron, steel and metalworking industries will be in Atlantic City attending the twenty-eighth National Metal Congress and the Metals Exposition, at which 400 manufacturers will exhibit their products.

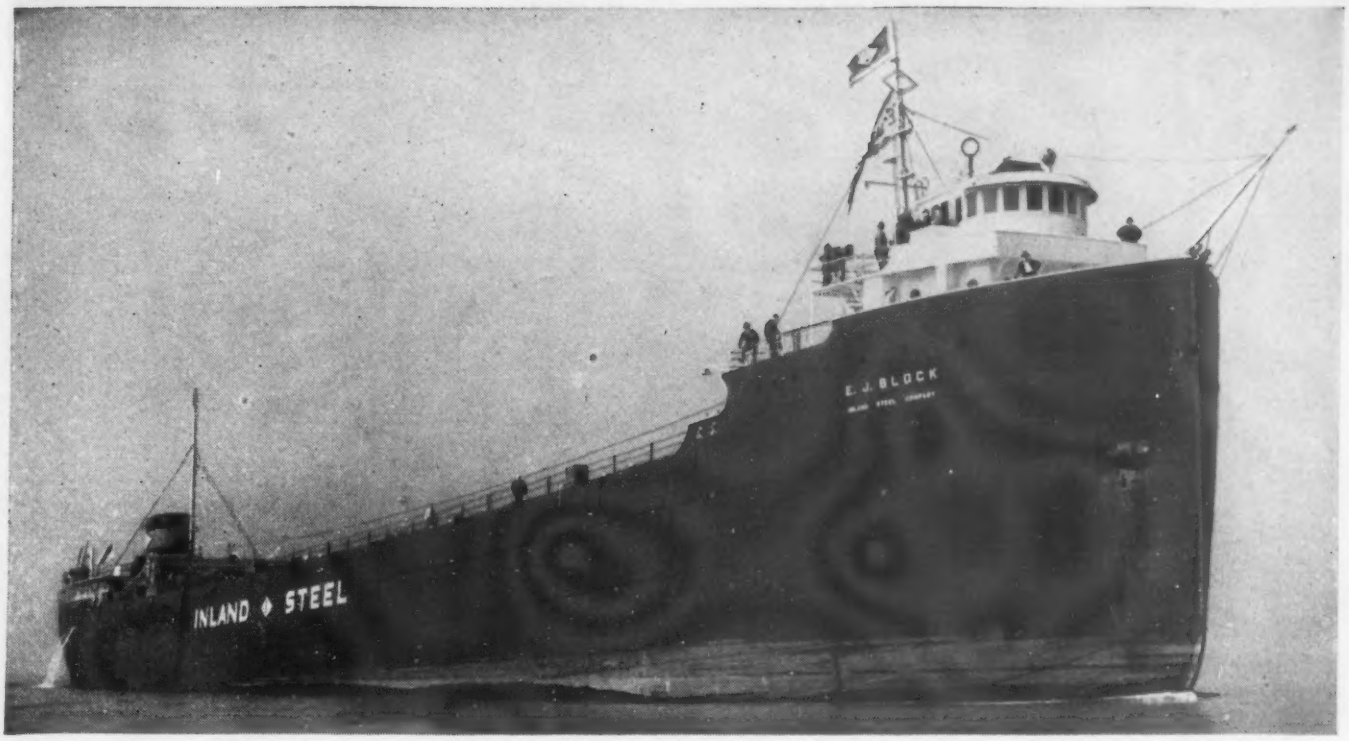
At this congress, other major technical societies will be co-operating with the American Society for Metals for the first time since 1944. In addition to the extensive technical program of ASM, there will be scores of papers, lectures and symposiums on the programs of the American Welding Society, Iron & Steel and Institute of Metals divisions of the American Institute of Mining & Metallurgical Engineers and the American Industrial Radium & X-Ray Society Inc.

Thousands of technicians will find in the 79 technical sessions of the four engineering societies and in the exposition answers to some of the problems resulting from the current plague of mounting costs and material scarcities. —pp. 137-149, inc.

SIGNS OF THE TIMES: Washington observers believe that despite the marked changes in the make-up of Congress resulting from last Tuesday's elections (p. 118) no fundamental change in the attitude of lawmakers regarding labor relations is in sight. . . . Newspaper advertisements featuring department store offerings of lead toys made in Great Britain and imported to the United States for sale during the Christmas season (p. 120) may prove to be the straw that will break the back of the domestic lead shortage. The petroleum industry, battery manufacturers and other important consumers of lead are asking pointed questions which may produce quick results. . . . Dr. Donald R. G. Cowan, management counselor, issues a timely warning to employers against the dangers in the present trend toward rigidity of payrolls (p. 122) and against the limitations that would be invoked by guaranteed wages or employment. . . Illustrating the great difference in the corrosive effects of atmospheres in various localities, the British Iron & Steel Research Association states that a polished piece of ordinary steel exposed at Khartoum, Egypt, acts as a fairly good mirror at the end of five years (p. 153), whereas a similar piece in Sheffield, England, is almost completely ruined as a mirror after one day's exposure. . . . Automobile production in the United States and Canada for the first ten months of this year totaled 2,503,268 units (p. 125), compared with 4,532,512 in the same period of 1941. Indicated total for the entire year of 1946 is about 3,100,000 units. . . . Automatic stud welding—first used extensively to attach studs to ship deck plates to secure wood deck planking in the wartime shipbuilding program (p. 158)—now is finding many industrial peacetime applications, ranging from the fabrication of boilers to the manufacture of household flat irons. . . . West Coast consumers of sheet steel are concerned over the fact that production capacity of this product in the Pacific states has leveled off at 153,000 tons annually (p. 131) whereas demand has mounted to 700,000 tons. Observers in southern California note a widespread resistance to higher prices in most raw commodities. . . . Steelmakers attending a meeting at Columbus, O., heard speakers describe interesting experiences with the use of oxygen in open-hearth furnaces. Much of the testimony was on the favorable side (p. 178), with one operator stating that if oxygen can be obtained at 25 cents per 1000 cu. ft., its use will save a lot of money in producing open-hearth steel.

E. C. Shane

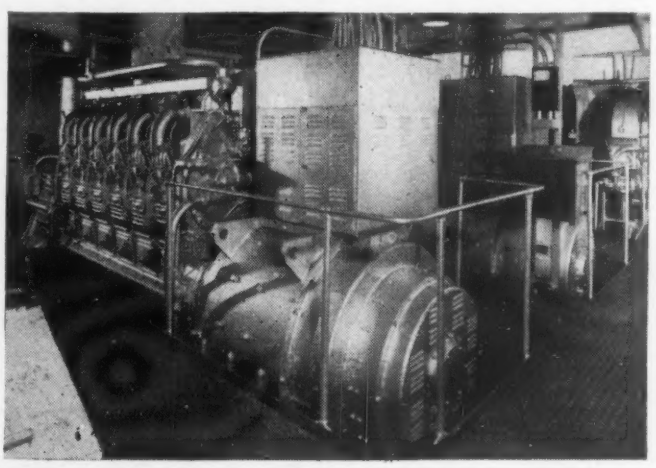
EDITOR-IN-CHIEF



INLAND Ore Freighter First With Diesel-Electric Power

Reconverted and streamlined, with new power, new steering system, new hatch arrangement, increased capacity and a multitude of other improvements, the E. J. BLOCK, of the Inland fleet, recently made her first cargo run, with complete success.

The first lake ore-carrier to be driven by diesel-electric power, the vessel has many revolutionary features, such as hydro-electric steering, direct control of the engines from the bridge, permanent radar installation and new ballast pumps of greatly increased capacity.



Power plant of the E. J. Block consisting of two 1200 horsepower diesels driving electric generators. Either one is capable of propelling the ship.

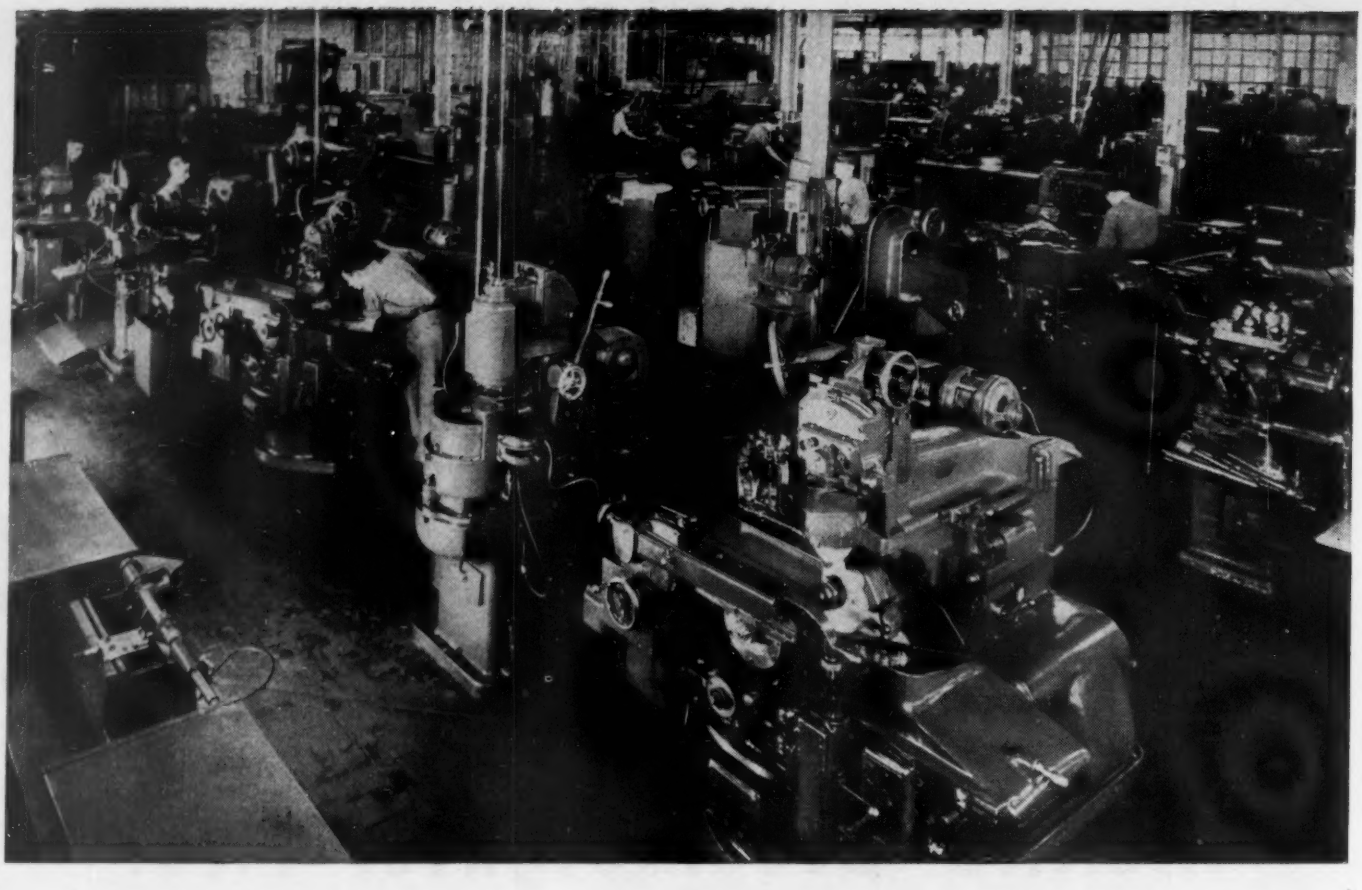
The changes in this ship, made by American Ship Building Company, make this a most efficient carrier of raw materials for Inland Steel. With the new power system the E. J. BLOCK is one of the fastest vessels of its type. Either of its two main engines is capable of driving the ship under full load. The new steering system, direct engine-control, and radar installations make for a safer vessel. The improved pumps allow ballast to be expelled more rapidly, and in conjunction with the improved hatch arrangements, allow much faster loading of the 11,000 tons of ore, limestone or other materials.

This advancement in raw material transportation is a part of the Inland program of modernization and expansion . . . a program which will continue to supply more and better steel for American industry.

INLAND STEEL

INLAND STEEL COMPANY, 38 South Dearborn Street, Chicago 3, Illinois. Sales Offices: Detroit, Indianapolis, Kansas City, Milwaukee, New York, St. Paul, St. Louis

PRINCIPAL PRODUCTS: BARS • STRUCTURALS • PLATES • SHEETS • STRIP • TIN PLATE • FLOOR PLATE • PILING • REINFORCING BARS • RAILS • TRACK ACCESSORIES



THIS HYDRAULIC OIL { Prevents Sludge / Prevents Rust / Prevents Stoppages

TEXACO *Regal Oils (R & O)* for hydraulic systems, in the viscosities recommended for your particular equipment, will prevent costly stoppages caused by sludge and rust.

Texaco Regal Oils (R & O) are strongly inhibited against rust and oxidation . . . free themselves rapidly of air and water . . . prevent sludge formation. They "plate" interior mechanisms so that moisture cannot reach and rust the metal.

In addition, *Regal Oils (R&O)* will not foam. This means smooth, dependable operation.

Leading makers of hydraulic equipment recommend or approve the use of *Texaco Regal Oils (R & O)*. They are available over a range of viscosities to assure trouble-free, economical performance of the largest to the smallest hydraulic units.

For full information, call the nearest of the more than 2300 Texaco distributing plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO

TEXACO Regal Oils (R&O)

FOR ALL HYDRAULIC UNITS

Tune in . . . TEXACO STAR THEATRE presents the NEW EDDIE BRACKEN SHOW every Sunday night. Metropolitan Opera broadcasts every Saturday afternoon.

STEEL
November 11, 1946

High Production Raises Steel Income

Rise in total third quarter net earnings of 21 steel producers reflects improvement in operating rate. Freedom in 1946 from excess profits tax helps total net income for first nine months to show gain

REFLECTING a high rate of operations, the steel industry's net profit in the third quarter of 1946 rose approximately 33 per cent above that for the preceding three months. As a result, the industry's total net profit for the first nine months was 38 per cent greater than that for the first nine months of 1945.

Compared with the third quarter of 1945 when adjustment from war to peacetime production was being made, net profit from the relatively uninterrupted operations in the third quarter of 1946 was 187 per cent greater.

For the third quarter of 1946, 21 steel ingot producers representing 85.8 per cent of the nation s ingot capacity showed net profit of $83,880,022, compared with $62,756,031 in the second quarter when a coal miners' strike hampered the steel industry's operations and $29,159,825 in the third quarter of 1945. Total net profit of those 21 producers in the first quarter of 1946 was only $17,309,084, reflecting the handicap of a steelworkers' strike.

For the first nine months of 1946 those 21 companies had a total net profit of $163,945,137, compared with only $118,271,621 in the corresponding period of 1945. Contributing to the improved financial showing for the first nine months of 1946 compared with the first nine months of 1945 was the freedom in 1946 from the federal excess profits tax, a tax that ended with 1945.

Each of the 21 steel producers showed a net profit in the third quarter of 1946, whereas one had shown a net loss in the second quarter. However, eight of them had a lower net profit in the third quarter than in the second quarter. All of the 21 showed greater net profits in the third quarter of 1946 than in the first quarter of 1946 or the third quarter of 1945. In the first quarter of 1946, eight of them reported net losses. Three of the 21 companies had net losses in the third quarter of 1945, and two of those three companies sustained a net loss for the first nine months of 1945. However, the earnings positions in both the second and third quarters of 1946 were sufficiently favorable for all but one of the 21 to report net profits for the first nine months of this year. In fact, 18 of the 21 companies showed greater net profits for the first nine months of 1946 than for the first nine months of 1945.

The steel industry's ingot production rate during the third quarter of 1946 was 86.5 per cent of capacity, compared with 67.9 per cent in the second quarter and 51.9 per cent in the first quarter. Production rate for the third quarter of 1945 was 77.8 per cent.

Summary of Net Profits of Steel Producers

	Third Qtr. 1946	Second Qtr. 1946	First Qtr. 1946	Third Qtr. 1945	First 9 Mos. 1946	First 9 Mos. 1945
United States Steel Corp.	$33,329,353	$13,900,270	$10,238,271	$11,624,420	$ 57,467,894	$ 43,777,793
Bethlehem Steel Corp.	10,543,005	14,447,207	4,804,438	7,761,667	29,794,650	23,499,258
Republic Steel Corp.	5,039,071	4,802,756	347,413*	1,617,675	9,494,414	7,973,927
Jones & Laughlin Steel Corp.	2,952,716	2,343,298	813,246	1,343,295	6,109,260	5,714,308
Youngstown Sheet & Tube Co.	4,871,852	3,099,099	1,205,444	1,627,080	9,176,395	5,635,027
National Steel Corp.	6,254,976	5,602,988	2,083,356	2,027,502	13,941,320	8,910,673
Inland Steel Co.	4,927,473	3,926,342	1,046,958	2,016,017	9,900,773	7,228,617
American Rolling Mill Co.	5,466,068	5,218,129	1,804,487	1,460,795	12,488,684	5,408,223
Wheeling Steel Corp.	2,085,120	1,080,266	22,655	1,085,887	3,188,041	3,419,478
Crucible Steel Co. of America	215,436	1,695,034	1,742,750*	1,734,895*	167,720	533,616*
Colorado Fuel & Iron Corp.	1,025,126	1,743,199	1,667,932*	42,196	1,100,393	960,989
Sharon Steel Corp.	1,493,715	291,973	343,339*	176,856	1,442,349	843,409
Alan Wood Steel Co.	463,515	130,047	263,422*	16,161	330,140	82,226
Allegheny Ludlum Steel Corp.	2,113,012	2,194,085	252,043	537,079	4,559,140	2,500,866
Continental Steel Corp.	303,033	380,153	10,961	138,566	694,147	499,131
Keystone Steel & Wire Co.	916,143	758,581	528,901	285,139	2,203,625	1,085,893
Copperweld Steel Co.	138,187	239,061	188,521*	49,669	188,727	525,628
Rotary Electric Steel Co.	109,073	229,091	54,429	27,347	392,593	286,067
Carpenter Steel Co.	627,103	547,224	388,120	336,241	1,562,447	965,903
Follansbee Steel Corp.	398,693	488,106	213,151*	4,120*	673,648	140,114
Pittsburgh Steel Co.	607,352	360,878*	1,177,697*	1,274,752*	931,223*	652,293*
Totals	$83,880,022	$62,756,031	$17,309,084	$29,159,825	$163,945,137	$118,271,621
Finishing Capacity Only:						
Acme Steel Co.	$ 1,211,685	$ 1,029,665	$ 679,329	$ 450,995	$ 2,920,679	$ 1,564,866
Superior Steel Corp.	236,800	473,300	36,678*	38,873	673,422	198,712
Pig Iron Capacity Only:						
Interlake Iron Corp.	$ 636,083	$ 234,666	$ 246,607	$ 89,189	$ 1,117,356	$ 224,241
Woodward Iron Co.	599,403	94,957	381,848	213,402	1,076,208	608,031
Sloss-Sheffield Steel & Iron Co.	266,979	23,002*	50,839	60,541*	294,816	206,587

* Loss.

Small Steel Mill Ownership Changing

Significant trend toward consolidation of nonintegrated and small producing units with steel fabricating industry accelerating

SEEKING to assure itself adequate supplies of flat rolled steel to sustain manufacturing operations, General Electric Co., Schenectady, N. Y., has acquired control of the Mahoning Valley Steel Co., Niles, O., one of the nation's few remaining nonintegrated sheet steel producers.

As a result of the transaction another small steel company passes into the hands of manufacturing and fabricating interests, a trend which has become particularly noticeable in recent months.

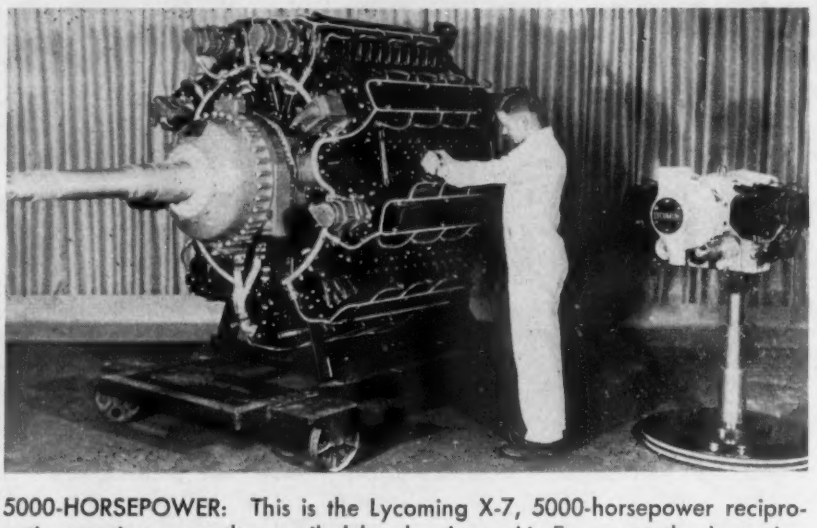
Still further emphasizing this trend was the announcement last week that Borg-Warner Corp., Chicago, large manufacturing interest, had purchased the physical assets of the Superior Sheet Steel Co., Canton, O., subsidiary of the Continental Steel Corp., Kokomo, Ind., to provide an additional source of sheet steel for itself.

Through the Mahoning Valley Steel Co. acquisition General Electric hopes to acquire adequate supplies of hot-rolled steel sheets used in the manufacture of its numerous products. Charles E. Wilson, General Electric president, in announcing the acquisition, however, said his company does not intend to go into the steel or other basic materials industries, and that at least 90 per cent of G-E's steel requirements of all kinds will continue to be purchased in the open steel market. Mr. Wilson pointed out that under OPA pricing policy in steel, General Electric could not find any other way to get adequate hot-rolled sheet supplies except by acquiring a producing company.

New President Named

Under the new ownership, John P. Hosack, who has been vice president and treasurer of Mahoning Valley Steel Co., will serve as president and treasurer of the reorganized company. George L. Wick will remain as secretary, Paul O. Cline as assistant secretary, and Thomas O. Clingan, assistant treasurer.

Mahoning Valley Steel Co. was organized in 1916 with capitalization of about $600,000. It has maximum annual potential capacity for producing 97,500 tons of hot-rolled sheets, produced on what are known as mechanized mills, a modernization of the old hand mills which has made for more economical production.



5000-HORSEPOWER: This is the Lycoming X-7, 5000-horsepower reciprocating engine, recently unveiled by the Army Air Forces at the Lycoming Division of Aviation Corp., Williamsport, Pa. The X-7 is designed for powering long-range bombers and transports and has 36 cylinders arranged in four banks of nine each. The big engines will give pilots additional control over speed and power with an arrangement similar to shifting gears in an automobile. At right is the 100-horsepower 0-235 Lycoming used to power personal aircraft. NEA photo

For some years past, Mahoning Valley Steel Co. and other nonintegrated steel producing interests have been striving desperately to stay in business in the face of severe competition from the new low-cost continuous sheet and strip mills, and increasing difficulty in obtaining semifinished steel supplies which these nonintegrated mills must purchase from the larger steel producers. This latter problem has been most critical the past year or so, and currently several of these nonintegrated interests are obtaining semifinished steel supplies under a government subsidy arrangement. This subsidy, it is understood, expires in December and it is uncertain whether it will be renewed.

In any event, the competitive position of many small and nonintegrated steelmakers has become increasingly difficult and promises to become even more so as normal conditions return to the steel market. Recognition of this is seen in the fact that within the past year or so a number of these smaller steel interests have been taken over by, or have become closely associated with, steel fabricating and manufacturing interests. These include, in addition to Mahoning Valley Steel Co., and Superior Sheet Steel Co., Central Iron & Steel Co., Harrisburg, Pa.; Andrews Steel Co., Newport, Ky., and its subsidiaries the Newport Rolling Mill Co., Globe Iron Roofing & Corrugating Co., Newport Culvert Co.; Parkersburg Iron & Steel Co., Parkersburg, W. Va.; Apollo Steel Co., Apollo, Pa.; Portsmouth, O., plant of the Wheeling Steel Corp.; and the Struthers Iron & Steel Co., Struthers, O.

Ownership of the Superior Sheet Steel Co. will pass to Borg-Warner Dec. 2. Present management and personnel, however, will continue, the plant being operated as a new Borg-Warner Division.

The Borg-Warner company is a large manufacturer of a miscellaneous list of items, some of them in the consumer goods category. Among products it manufactures are mechanical parts of various kinds, gears, transmissions, machinery, etc., as well as such consumer items as refrigerators, electric washers, deep-freeze units, etc.

In acquiring the Superior company Borg-Warner officials state they hope to increase their company's supply of sheets. However, it has no intention of extending into the sheet steel industry and shall continue to rely upon large established mills for 85 per cent of its current steel requirements. Borg-Warner already operates steel facilities through its Ingersoll Steel & Disc Division.

Superior Sheet Steel Co. was formed in 1919 and has capacity for producing 90,000 tons of hot-rolled sheets, 73,000

tons of galvanized sheets and 35,000 tons of long ternes.

Some months ago new interests acquired the Portsmouth, O., works of the Wheeling Steel Corp. for $12 million. A new company, known as the Portsmouth Steel Co., was formed to operate the plant, the transaction with Wheeling Steel including a 3-year conversion agreement whereby Wheeling Steel will roll sheets at its Steubenville, O., plant up to 9300 tons of slabs per month for the Portsmouth company. In addition the Kaiser-Frazer and Graham-Paige automobile interests will buy from Portsmouth for three years, sheets, slabs and wire products. These automobile firms are purchasing all of their sheet needs up to 54-in. wide and such additional tonnages of greater width as they may desire up to 7900 tons monthly. The deal on slabs is up to 7900 tons per month. The Portsmouth company also has several 3-year contracts with Wheeling Steel providing for sale of slabs, coke, stirring rod and silicon sheet bars. It is estimated Portsmouth has 10,000 tons per month of tie plates and wire products available for sale to others.

As a result of this steel hookup the Kaiser-Frazer interests report their supply position, which early in the year was extremely precarious, has improved to the point, in the words of J. W. Frazer, the company now has steel "sticking out of its ears" and in sufficient quantity to permit assembly of 1000 cars per day, though currently it is only producing around 130 daily. To relieve the shortage of pig iron which was hampering its production of castings, the Kaiser-Frazer interests recently leased for three years the blast furnace at Struthers, O., of the Struthers Iron & Steel Co. This stack had been idle for about a year. It is the only remaining merchant blast furnace in the Mahoning Valley district. Once the area had 40 to 50 small merchant furnaces. Under the terms of the lease the Kaiser-Frazer Parts Corp. will pay $335,000 and all taxes on the Struthers' furnace. The Struthers company will keep up its $450,000 insurance policy, while Kaiser-Frazer will maintain the stack in good repair and return it in good condition on completion of the lease.

Several weeks ago stockholders of the Apollo Steel Co., Apollo, Pa., a nonintegrated sheetmaker, approved sale of the property to Irving Grayson, Detroit, reportedly representing a group of steel fabricators. Formal announcement of the purchase and the names of the purchasers are expected some time next month. It is understood the sale agreement states that the buyer must continue to operate the plant until present order backlogs are cleared up, which should be around next Feb. 1. The Apollo company, which has capacity for producing 132,000 tons of hot-rolled sheets and 24,000 tons of galvanized sheets, has not booked any new orders for months and no new orders currently are being accepted. This leads observers in the trade to the view the plant will be used for other purposes. At any rate, the present Apollo company's name will be changed to Apollo Pittsburgh Corp. for the purpose of liquidating assets other than the steelworks and equipment purchased by the Grayson interests, while the purchasers of the steelworks will operate it under a completely new name.

The Apollo company was organized in April, 1912. Like other nonintegrated steelmakers its problems have intensified steadily in recent years as a result of the competition from the new continuous mills and the increasing difficulty in obtaining sheet bars from the larger integrated mills. Like the Mahoning Valley Steel Co. it has been receiving semifinished in recent months under the government subsidy arrangement.

Operated by Follansbee

Some months ago the Parkersburg Iron & Steel Co., Parkersburg, W. Va., decided to close down because of the difficulties attending continuance of operations. Since then the Follansbee Steel Corp. has taken over operation of Parkersburg's sheet mill facilities, the arrangement not including an investment of additional capital by Follansbee, but carrying a provision that a large percentage of the mill's output would accrue to Follansbee. A substantial part of production is electrical sheets. The plant, which is operated as the Parkersburg Steel Co., has annual rolling capacity of 36,000 net tons of sheets. It was sold by the original Parkersburg Iron & Steel interests to Louis Berkman Co. & Associates, Steubenville, O., who formed a new company. The Berkman interests now are operating the fabricating facilities of the plant, manufacturing stove pipe elbows, drip pans, roasting pans and other items formerly made by the original Parkersburg Iron & Steel Co.

About mid-summer the International Detrola Corp., Detroit, purchased the steelmaking rolling mill, fabricating plants and coal mining interests of the Andrews Steel Co., Newport, Ky. Properties included were the Andrews Steel Plant Division, the Newport Rolling Mill Co. and its divisions, the Globe Iron Roofing & Corrugating Co., the Newport Culvert Co., and the Hardy-Burlington Mining Co. International Detrola has ten other plants in this country and Canada and manufactures radio receivers and phonographs, refrigerating

(*Please turn to Page* 262)

Bethlehem Head Opposes Further Wage Spiraling

Says steel industry can't pay higher wage rates and favors decreasing prices for the good of the entire economy

THE STEEL industry can't pay higher wage rates on the basis of present prices for steel—"and even if it should be proved that it could, I would be for decreasing prices for the good of the country's economy as a whole rather than further increasing wages," said Eugene G. Grace, chairman, Bethlehem Steel Corp., Bethlehem, Pa., at press conference following the corporation's quarterly meeting.

Mr. Grace said he thought fast spiraling wages, without comparable increase in the production of labor were disrupting the prosperity of the country and could only bring real disaster in the end, if not checked.

The Bethlehem executive was optimistic over the outlook in steel for next year, provided there was a return to a sound and stable economy.

He said that if there hadn't been the loss of 12,000,000 tons so far this year as a result of strikes excess demand "would have been pretty well taken care of by now—in most items."

The relationship between wages and prices must be constantly kept in mind, however, in appraising future prospects, Mr. Grace pointed out. Wages are the major item in steel costs, and if costs go higher prices will tend higher, and if prices get too high, then demand slumps.

He thought that one of the first things that should be done with the convening of the new Congress was the enactment of a "fair labor law, providing for conclusive collective bargaining." He explained that he meant by conclusive, collective bargaining that would stick for the length of the contract involved, so that management could plan ahead and know where it stands. He thought the Wage-Hour law should be reviewed and more definitely defined, and that retroactivity, as a policy which is often set up under this law, should be abolished.

Mr. Grace looked for a further tapering in the movement of scrap over the remainder of the year, although he said that Bethlehem's shipbreaking operations in Baltimore were being stepped up to a rate now of about 10,000 tons per month.

Maryland's Metalworking Industries Hindered by Materials Shortages

Unbalanced inventories restrict output. Ship repair activity expected to increase with settlement of maritime strikes. Structural business limited by CPA regulations and increasing costs. Numerous railroad lists still active

BALTIMORE

MOST branches of the metalworking industry here are operating as near capacity as supply of raw materials permits. Two notable exceptions are ship and aircraft industries. In the case of shipyards, an improved volume of repair work is starting now that the latest maritime strike has been settled. In fact, a heavy amount of this work is in prospect as repairs have been at a low ebb for almost two months as a result of waterfront disturbances.

Stringency of steel is reflected by the position of district distributors, practically all of whom report less business for October than in September; shortage is particularly acute in sheets, strip and shapes, especially in the lighter forms. Hot carbon bars, 1½ inches and lighter, are almost as scarce, and light gage plates 3/16 and ¼-inch in thickness are difficult to obtain.

Metal companies complain about the lack of balance in their inventories. In various cases they have fairly good supply of some products and some sizes of products, but are short in other respects, with a result that their operations are being delayed and their finished manufactured items are well behind schedule in reaching the market.

While various railroads have covered on track tonnage for next year, including the Baltimore & Ohio, which recently closed on more than 80,000 tons of rail and 35,000 tons of accessories, there are still lists to be closed, including the Southern. Meanwhile, the Baltimore & Ohio, the Norfolk & Western, and several other railroads are behind on their car repair schedules due to inability to obtain sufficient quantities of steel, wheels and other materials. They along with other car builders and car repairers may soon be given directive aid by the government for certain programs.

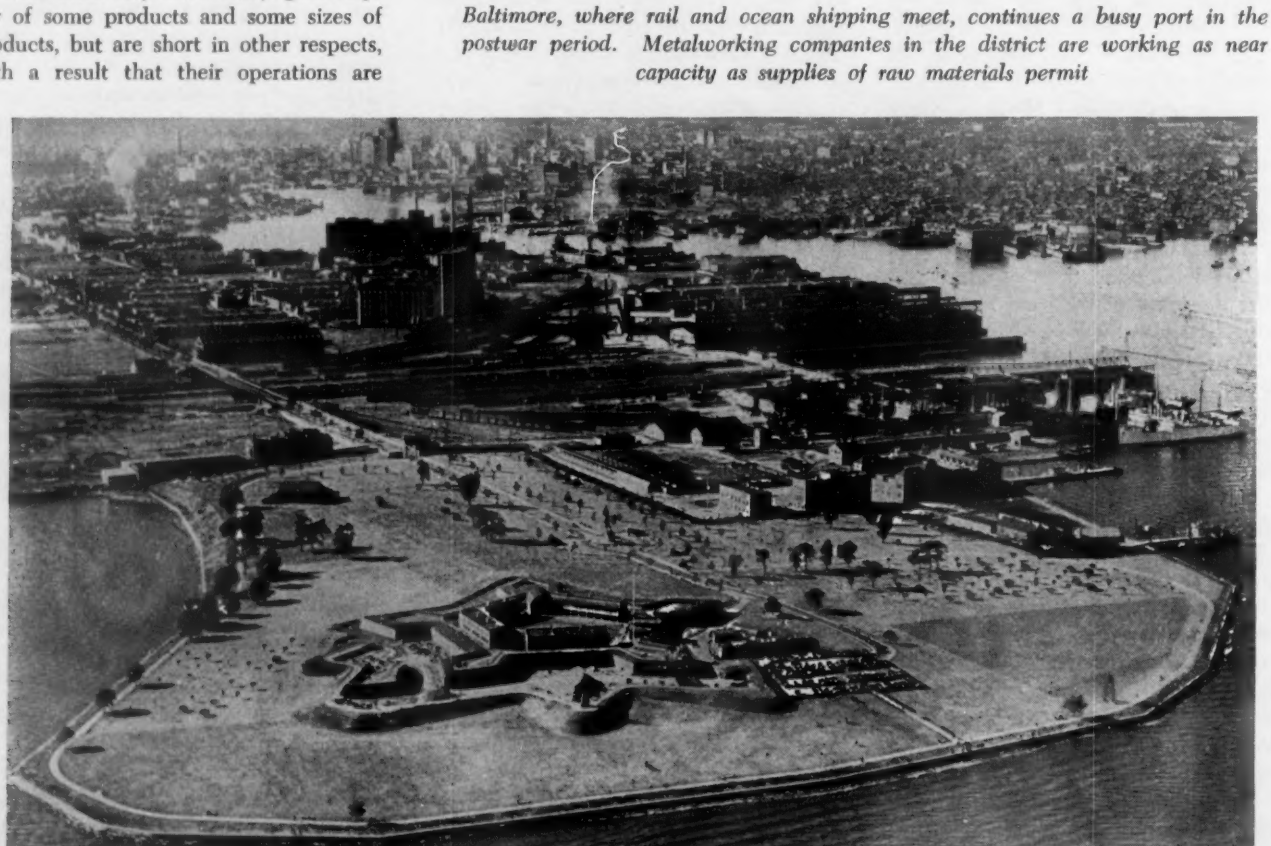
Structural activity is restricted by CPA limitations and advancing costs, with seasonal influences also having a bearing. Major projects now active include three or four bridges, with the 5400-ton superstructure for the Anacosta river bridge, Washington, outstanding. Bids on this latter work went in Oct. 31. A bridge at Arlington, Va., requiring 500 tons and a Maryland state bridge, involving 340 tons, are active.

Little commercial or civic work is being figured, although there is enough small miscellaneous tonnage to keep the local fabricating shops busy, along with such orders as they booked earlier in the year before governmental restrictions began to squeeze demand. As a matter of fact, most fabricating shops are having difficulty keeping their stocks in balance because of stringency at the shape mills. These mills are now producing close to 400,000 tons per month, but so heavy is demand, especially for sections in the light category, 3 to 6 inches, that shape producers are having trouble supplying the structural shops.

Many of these small shapes are not only going into light contruction work, such as prefabricated housing, which has been given a green light in connection with the national housing program, but are also going into equipment, such as bulldozers, ditch diggers and dredging machines, and into agricultural equipment.

The housing program is enabling some iron foundries and pipe shops in the district to operate at an all-time high. Fabricators of light sheets for required housing applications also are benefiting. However, much of this, especially with respect to the foundries, is at the ex-

Baltimore, where rail and ocean shipping meet, continues a busy port in the postwar period. Metalworking companies in the district are working as near capacity as supplies of raw materials permit



pense of other companies which are unable to obtain ratings for materials.

With the canning season over, operations at food packing plants are off substantially. Metal decorators—those manufacturing containers for products not on the critical list, as set up by Washington—are operating on a limited basis due to scarcity of black plate.

Electrical equipment manufacturers are able to obtain adequate steel in various cases but are being held up by shortage of copper or lead or lack of components. Bolt and nut production is behind schedule, with demand brisk and with backlogs probably as far extended as at any time during the war. Consumers of wire products report mills far behind on commitments and in the coated wires this is especially so.

Steel producers are booking more freely for next year. In fact, within the past week one leading steelmaker has begun accepting tonnage for first quarter on sheets, strip, plates, shapes and bars, among other products. Offerings, however, are limited in view of the heavy carryover anticipated at the end of the year. Another large sheet producer has opened books on hot and cold-rolled sheets and galvanized. Quotas are small and may have to be further reduced later as rated tonnage is in prospect for the first quarter of next year, as well as being a factor in the current period. One leading mill may not take general action on sheets before the middle of November and then only for the first month of the new quarter, and in view of the year-end carryover, it is likely little, if any, additional tonnage can be added.

While operating at a high rate, district steel mills are still being handicapped by shortage of scrap and pig iron and also coke, which would soon become acute if the present threat of a soft coal strike materializes. In fact, curtailment in steelmaking operations would set in within a week if a mine walkout occurred.

Steel mill expansion continues to be delayed by lack of motors and electrical control equipment, although the new cold mill at Sparrows Point may finally get into production late in the first quarter.

Corporations' Net Profits Reach New High for Year

Net earnings of corporations reached the highest level of this year during the third quarter, a survey by the National City Bank of New York indicates.

Aiding third quarter earnings were unprecedented peacetime sales volumes in many lines, higher prices, and a lull in industrial disputes.

For a group of 350 industrial corporations, aggregate net income after taxes for the third quarter was approximately 70 per cent above the third quarter of 1945 when the excess profits tax was in effect and net income was depressed by cancellations of war orders and reconversion costs. Through this relative improvement, a decline in earnings in the first six months was converted into a 12 per cent increase for the first nine months. Importance of removal of the excess profits tax is indicated by the fact earnings before taxes were in most cases lower than in the first nine months of 1945, the bank said.

For numerous companies the reported net income was increased, or the net deficit reduced, by application of carryback tax credits or the use of postwar reserves, which are nonrecurring and tend to conceal the unsatisfactory results of the current operations. The real test, the bank pointed out, will come when the gap of deferred demands begins to be filled and when these credits and reserves are no longer available.

Value of Manufacturers' Inventories Hits New High

Rising nearly $400 million in September, manufacturers' inventories reached a new high in dollar value for the third consecutive month.

The new peak, the U. S. Department of Commerce said, was $18.8 billion on Sept. 30. However, increased prices have added considerably to the value of inventories.

The September rise is about equal to the August gain and puts inventories about $2½ billion above the Jan. 1 level. Of this increase, $1.6 billion was added in July, August and September.

Since September, however, the National Association of Purchasing Agents has received reports which indicate a slight drop in inventories.

Present, Past and Pending

■ THREE STATES OUTLAW CLOSED SHOP

WASHINGTON—Constitutional amendments to prohibit closed shop agreements were adopted in Nebraska, South Dakota and Arizona in the Nov. 5 elections. Massachusetts voters approved compulsory financial reports by unions.

■ WAA AGAIN REJECTS BIDS FOR SOUTH CHICAGO PLANT

CHICAGO—All bids for the $92 million surplus South Chicago steel plant, which Republic Steel Corp. built for the government in 1943 and has operated since, have been rejected by War Assets Administration. Dec. 5 has been set as the date for submission of new proposals.

■ NATIONAL FOUNDERS ELECT I. R. WAGNER

NEW YORK—I. R. Wagner, Electric Steel Castings Co., Indianapolis, was elected president of the National Founders Association at the forty-ninth annual meeting here Nov. 7-8. He succeeds Herman Menck, Harnischfeger Corp., Milwaukee.

■ EASTERN STAINLESS INCREASING CAPACITY 50 PER CENT

BALTIMORE—Eastern Stainless Steel Corp. has attained full production on a new 48-inch four-high mill and has added other new equipment, including two specially designed muffle-type annealing furnaces, a hot mill finishing unit and seven sheet polishing machines. With additional new equipment to be installed by Jan. 1, the company will have increased capacity 50 per cent in 1946.

■ FARM EQUIPMENT PRODUCTION DECLINES

WASHINGTON—Production of farm equipment declined about 5 per cent in September from the August level, according to Civilian Production Administration.

■ HOUSTON SHIPYARD LEASED FOR SHIP BREAKING

HOUSTON, TEX.—War Assets Administration has leased the Todd Shipyard here to Harrisburg Machine Co. for breaking ships into scrap.

■ BUYS 80,000 TONS OF PEARL HARBOR SCRAP

EAST CHICAGO, IND.—Calumet Iron & Supply Co. has purchased 80,000 tons of scrap at Pearl Harbor, T. H. Scrap will be shipped to the U. S. as soon as possible.

■ CIO STEELWORKERS TO SUE FOR "WALKING" PAY

WASHINGTON—Attorneys for the United Steelworkers of America said last week they plan to file suit against a number of steel companies for portal-to-portal pay claimed under the Fair Labor Standards Act. Union holds the Supreme Court's refusal to rehear the Mt. Clemens Pottery Co. case upholds the principle of "walking time" pay.

■ SURPLUS LANDING MATS TO MAKE CORN CRIBS

WASHINGTON—Forty bidders have been awarded 4,196,262 sq ft of surplus steel aircraft landing mats for use in building emergency corn cribs.

Automotive Industry Receiving 10½ Per Cent of Finished Steel

Warehouses distribute nearly 20 per cent of output in first five months of 1946. Containers are second largest consumer, with construction in third place. Shipbuilding, wartime leader, far down the list. Exports take nearly 6 per cent

THE automotive industry stepped back into first place among steel consuming industries in the first five months of 1946. Makers of automotive equipment, excluding tractors, received 10½ per cent of all finished steel shipped during the period, or 1,727,657 tons.

Finished steel shipments, including alloy and stainless, amounted to 16,579,681 tons, according to monthly figures compiled by the American Iron & Steel Institute.

In second place as a consuming industry were the container manufacturers who received 1,569,195 tons, or a little more than 9 per cent.

In third place was the construction industry, including maintenance, which received 1,516,281 tons.

Fourth place was held by rail transportation which was the recipient of 1,243,861 tons. Machinery, industrial equipment and tools occupied fifth place with 732,689 tons.

Shipbuilding, which held first place during the war years, fell far down the list, and received only 90,426 tons. Ordnance and other military classifications were another peacetime casualty and received only 20,854 tons.

Nearly 20 per cent of all finished steel was distributed through warehouses during the first five months. The distributors received 3,281,611 tons from the mills.

Export requirements took a little less than 6 per cent of the total, 955,766 tons.

Converting and processing industries received 1,284,953 tons. These include makers of wire and wire products, pipes and tubing, bolts, nuts and rivets, forgings, sheet and strip mills, cold bar mills.

Shipments to agricultural equipment makers amounted to 375,524 tons, or slightly more than 2 per cent of the total.

Makers of appliances, utensils and cutlery received less than 3 per cent with 457,923 tons, and manufacturers of other domestic and commercial equipment received 470,575 tons.

The accompanying table shows the consumption of leading products.

New Consumption Records Set for Scrap and Pig Iron

A postwar record in consumption of home scrap and pig iron was set in August when steel production also rose to a new postwar high.

Consumption of home scrap that month, the U. S. Bureau of Mines reported, totaled 2,316,000 tons while consumption of pig iron reached 4,193,000 tons. However, the dwindling supply of purchased scrap was reflected in further declines in both consumption and stocks of this material. Consumption of purchased scrap amounted to 1,854,000 tons in August, and consumers' stocks of it at the end of the month had declined to 1,948,000 tons.

Increased consumption of home scrap was accompanied by a drop in consumers' stocks of such material to 1,020,000 tons at the end of August. Dealers' stocks of iron and steel scrap dropped to the low figure of 438,792 tons. Pig iron stocks on Aug. 31 were only 688,000 tons, lowest on record.

See 1947 Steel Output Falling Short of Needs

Steel requirements for 1947 will be about 63 million tons of finished products, while production will be only about 56 million tons, according to estimates by Civilian Production Administration officials in Washington.

Based on present steelmaking capacity, the production of 63 million tons of finished steel would necessitate operations at nearly 100 per cent of capacity throughout the year. Production of 56 million tons of finished steel would mean capacity would be operated at a little less than 90 per cent.

Distribution of Steel to Consuming Industries–January-May 1946

Market Classification	Shapes	Plates	Hot-Rolled Bars	Cold-Finished Bars	Seamless Tubing	Drawn Wire	Hot-Rolled Sheets	Cold-Rolled Sheets	Coated Sheets	Hot-Rolled Strip	Cold-Rolled Strip	Total (All Products)
Converting and Processing	7,767	81,970	630,265	42,839	30,034	257,985	172,050	14,881	4,716	105,252	36,596	1,284,953
Jobbers, Dealers, Distributors	286,102	227,508	355,389	186,493	353 906	50,023	291,328	192,426	171,371	36,381	17,925	3,281,611
Construction, Maintenance	514,333	295,242	92,296	1,339	90,324	9,213	101,186	18,086	62,043	24,595	3,557	1,516,281
Contractors' Products	1,450	20,299	32,084	3,616	10,321	7,595	161,124	91,282	86,738	20,021	16,549	500,204
Automotive, excl. Tractors	7,465	73,307	279,165	72,739	2 974	41,261	481,831	455,757	27,551	126,301	75,297	1,727,657
Rail Transportation	94,900	208,870	115,232	2,116	1,211	2,419	46,792	4,828	13,003	14,437	2,170	1,243,861
Shipbuilding	14,756	53,730	7,026	678	562	812	4,317	2,134	2,806	420	80	90,426
Aircraft	.....	699	565	1,377	544	212	966	684	580	465	792	8,435
Oil, Gas Drilling	3,164	12,425	14,668	1,661	13,543	117	1,326	22	12	49	69	73,492
Mining, Quarrying, Lumbering	3,822	12,213	14,418	861	222	761	5,635	1,083	391	1,118	67	61,488
Agricultural	10,792	23,409	158,802	22,407	793	8,801	46,588	10,216	37,014	29,439	1,675	375,524
Machinery, Indus. Equip., Tools	47,792	148,573	185,301	80,848	27,200	20,436	67,223	21,535	5,196	30,432	22,350	732,689
Elect. Mach., Equip.	6,474	24,093	36,511	15,345	191	8,946	72,830	36,478	6,153	18,110	18,948	392,472
Appliances, Utensils, Cutlery	85	2,571	5,327	12,569	1,574	10,666	70,734	197,408	26,390	14,157	32,733	457,923
Other Domestic Commercial Equip.	1,079	16,181	21,406	16,823	716	74,193	80,066	127,430	21,203	23,706	45,819	470,575
Containers	.....	48,835	6,095	28	....	26,710	216,321	85,571	13,582	43,921	28,187	1,569,195
Ordnance, Other Military	759	748	3,822	651	35	516	2,230	2,149	238	1,182	1,094	20,854
Unclassified	78,101	78,807	386,295	70,714	72,898	163,758	86,184	72,637	28,146	25,440	172,650	1,816,275
Export	66,785	103,436	56,203	4,607	36,923	24,465	73,067	52,636	25,012	21,218	5,403	955,766
Total	1,145,616	1,432,916	2,400,870	537,711	643,971	708,889	1,981,798	1,387,243	532,045	536,664	481,956	16,579,681

Pilot Nuclear Power Plants Are Seen by Compton Within 5 Years

President of MIT, speaking at meeting of Detroit Economic Club, expects some useful uses of atomic power in less than 10 years. Holds beating of this timetable hinges on solution of certain metallurgical and other problems

IN AN illuminating address dealing with the future of atomic energy in science, medicine and industry, Dr. Karl T. Compton, president, Massachusetts Institute of Technology, Cambridge, Mass., told the Economic Club of Detroit last week he foresaw development of nuclear power plants of pilot stage type well within five years, and some useful industrial uses of atomic power within less than ten years.

Beating this timetable will depend upon the pressure and the backing, together with a certain element of luck as to whether some of the metallurgical and other problems which must be overcome will submit readily or with difficulty to the efforts directed at them, he declared.

Dr. Compton said studies already made have indicated possibility of production of nuclear power, using the heat from uranium piles, at a cost of 0.8 cent per kilowatt-hour with an investment of $25 million, against 0.65 cent per kilowatt-hour with a conventional steam power plant costing $10 million, and figuring coal at $7 per ton. Should the cost of coal amount to around $10 per ton, it is figured the two methods might have comparable economy. At the current stage of the art, the convenience of nuclear power plants far outweighs their economy, suggesting the first logical application might be for ship propulsion, since atomic energy marine installations would release bunker space for useful cargo and also free the ship from dependence on coaling stations.

Serious Problems Encountered

However, there are two serious problems in the uranium pile type of power plant, one being the matter of disposal of dangerously radioactive wastes, the other relating to the shielding or protection of operating personnel. A minimum of 6 feet of concrete, impregnated with barium, appears to be the best form of shielding yet devised.

Dr. Compton gave some startling figures on amounts of energy to be derived from the fissionable type of uranium, or U235 as it is called. In the process of fission, 2.2 pounds of this material will liberate the same amount of heat as the burning of 3000 tons of coal. World production of U235 up to 1939 is estimated at around 7 tons, or the equivalent of 175 billion kilowatt-hours of electric power. By contrast, the Detroit Edison Co. last year generated about 5 billion kilowatt-hours. Figuring a 10 per cent efficiency on an atomic power plant, the weight of U-235 produced to 1939 would have been enough to supply the Detroit Edison load for 3½ years. Dr. Compton added that well over 1000 tons of U-235 have now been produced, and recent discoveries have opened the possibility of realizing a 30 per cent efficiency on an atomic energy power plant. Here again major problems await solution before complete practicality is demonstrated.

Atomic energy development in this country is now in process of being transferred to the supervision of the new atomic energy commission (STEEL, Nov. 4, p. 69), although the great war installations at Oak Ridge, Tenn., Hanford, Wash., Los Alamos, N. Mex., and elsewhere are all in operation but with depleted staffs. Laboratory activity is being centered at the University of California, the University of Chicago and in the east at Camp Upton, Long Island, N. Y., the latter a new co-operative project of nine eastern universities. Direction of the Pacific Coast and Chicago laboratories also is divided among a score or more leading universities.

Use of radioactive material from the great uranium piles erected during the war, for biological and chemical purposes, has already begun and should proceed rapidly. Dr. Compton said many of the radioactive materials produced in the operation of these piles were simply stored as byproducts during the war when the desired end-product was either fissionable uranium or plutonium for use in the atomic bomb. Desired elements can now be obtained by appropriate chemical treatment of these byproduct residues.

Mullen Heads Institute of Steel Construction

Election of T. R. Mullen to the presidency of the American Institute of Steel Construction was announced at the annual convention of the organization at San Diego, Calif., Oct. 28-31. He is treasurer and general manager, Lehigh Structural Steel Co., Allentown, Pa.

Other officers of the institute were elected as follows: First vice president, N. R. Patterson, Patterson Steel Co., Tulsa, Okla.; second vice president, A. G. Roach, Consolidated Steel Corp., Los Angeles; treasurer, Clyde MacCornack, Phoenix Bridge Co., Phoenixville, Pa.

Newly elected directors: For three-year term: Henry Bohnsack, International Steel Co., Evansville, Ind.; C. G. Conley, Mt. Vernon Bridge Co., Mt. Vernon, O.; A. J. Dyer, Nashville Bridge Co., Nashville, Tenn.; J. Philip Murphy, Judson Pacific Murphy Corp., Los Angeles; R. C. Mahon, R. C. Mahon Co., Detroit; E. K. Klingelhofer, Pittsburgh Bridge & Iron Works, Pittsburgh; N. R. Patterson, Patterson Steel Co., Tulsa, Okla.; R. D. Wood, Mississippi Valley Structural Steel Co., Chicago; and A. G. Roach, Consolidated Steel Co.

Directors for two-year term were elected as follows: Clyde MacCornack, Phoenix Bridge Co., Phoenixville, Pa.; F. K. McDaniel, American Bridge Co., Pittsburgh; and T. K. O'Connor, Harman Steel Co., Williamsett, Mass. Ferdinand Schmitz Jr., Pacific Car & Foundry Co., Seattle, was elected director for one-year term.

Steel Products Warehouse Meeting Speakers Named

Bennett S. Chapple Sr., assistant to the president, American Rolling Mill Co., Middletown, O., will deliver the major guest address at the fifth annual convention banquet of the Steel Products Warehouse Association, climaxing a two-day meeting in Hotel Book-Cadillac, Detroit, Nov. 14-15.

Mr. Chapple's talk, "Facing Today and Tomorrow," will stress present problems harassing the steel industry, their possible solutions, and the outlook of the industry in a future substantially free from government controls.

Arthur H. Allen, Detroit editor of STEEL, will present the introductory remarks as toastmaster.

Other speakers and their subjects scheduled for Nov. 15 are: Henry P. Fowler, general counsel, manager, Trade Association Department, Chamber of Commerce of the United States, "Trade Association Objectives in a Free Economy;" James E. Fitzgerald, Steel Branch, Metals & Minerals Division, Civilian Production Administration, "Supply Problems of Reconversion;" and Dr. Neil H. Jacoby, professor of finance, School of Business, and vice president, University of Chicago, "Economic Policies for Business Independence."

Firm Orders for Tools Slacken In New England

Noticeable decline in buying of standard equipment noted. Builders estimating on sizable list of potential business

BOSTON — Machine tool builders are estimating a substantial volume of potential business, but new firm orders, notably for standard tools, are slackening.

Bookings are holding better in New England and the East, slightly better than in the Midwest. Tool and die shops in the Detroit area are much busier than was the case some months back, presumably on first distinct new models due in 1948.

Slight new machine tool volume has developed as yet, indeed the lack of buying by automobile interests is keenly felt in some lines. Another adverse factor is surplus sales. Up in New England are more than $1 million worth of single-purpose lathes, Boston WAA office listing 235 standard-make tools.

With shipments ahead of new orders, most shops are making progress against backlogs, although deliveries are still 14 to 16 weeks on some tools, including internal grinders. At current production schedules backlogs are generally sufficient for several months.

In spots there are sizable orders being placed. General Electric Co. is buying many heavy-duty tools for a generator plant, Schenectady, N. Y. An aviation engine builder is buying for a new model, and in Pennsylvania a textile mill equipment plant is distributing contracts.

Textile machinery builders in this section are mostly well tooled, having bought heavily from surplus soon after the war, taking title to many machines already in their plants.

HUNDREDTH PLATING MACHINE: Udylite Corp., Detroit, has produced and shipped 100 of these large fully automatic plating machines during the past two years. They are being used in 14 different processes on a wide range of plated parts

Tool Delivery Reported Improving at St. Louis

St. Louis—Shipments of machine tools to this district are improving somewhat, apparently due to easing in manufacturers' electric motors bottlenecks. Demand is steady and buyers do not shy away from delivery dates extended as much as two years.

Few dealers report any cancellations and duplicate orders are believed to be rare. In general small tools deliveries are later than large.

New tool demand is bolstered by dwindling surplus sales. Although surpluses have caused considerable distress in the trade, dealers mostly are happy that disposals have taken place now rather than in a possibly depressed 1947. Most are surprised demand has held up as well as it has.

Principal demand now is from plant expansion projects, many of which have been delayed by lack of construction materials. Current pressure for tool deliveries indicates belief that construction shortages are due to ease soon.

New firms are still springing up but in lesser numbers. Veterans' calls are declining, partly because their wants have been mainly in the surplus field and partly because few desire to go into the above-$5000 price range, in which new tools are most quickly available. Dealers foresee a steady demand well into 1947 provided a recession psychology does not bring on a wave of cancellations.

Purchasing Mission Acquiring Machinery for Venezuela

Washington—A purchasing commission from Venezuela, now in the United States, is reported to be acquiring materials including agricultural machinery valued in the neighborhood of $1,000,000, according to the Department of Commerce.

Extensive purchases already have been made for the five ministries of the Venezuelan government from surplus materials in Trinidad, for which payment of $548,219 has been made. Road building equipment and other materials purchased in Panama amounted to between $300,000 and $400,000.

The Minister of Fomento has said that purchases may reach a total of between $3,000,000 and $3,500,000, including the purchases already made.

Electric Industrial Truck Bookings Fall in September

Domestic bookings for electric industrial trucks and tractors during September totaled 219 units, a decrease from the 339 in August.

Net value of chassis only booked in September totaled $928,367, compared with $1,457,448 in August, the Electric Industrial Truck Association, Chicago, reported.

New Steel Industry Study Is Launched

Government studies of the steel industry, started a year ago, will be rounded out by a detailed survey being launched by the Division of Machinery & Metals, Department of Commerce, to cover postwar developments.

The work will bring up to date the story first published by the Senate Military Affairs Committee last year. It will cover in considerable detail the increased capacity of the steel industry resulting from the war, and what is being done with it.

It will examine such details as to whether there is a scarcity, long-range, of coking coal; it will report extensively on the relationship of new capacity to markets.

A detailed study of foreign steel industries will be included.

Mills To Get Premiums for Sheet Output

Payment plan, retroactive to Nov. 1, designed to raise output and increase shipments to West Coast

AT LEAST three more premium payment regulations will be issued this month, Housing Expediter Wilson W. Wyatt announced last week. The new regulations, retroactive to Nov. 1, will cover galvanized steel sheet, 24-gage and lighter, carbon steel sheet, and millwork items.

The galvanized steel sheet and carbon steel sheet plans are intended not only to raise production generally, but to increase the amount of shipments to Washington, Oregon, California, Utah, Nevada, Idaho and Arizona. General statements on these plans follow:

Galvanized Steel Sheets: Includes zinc-coated steel or iron sheet, flat or formed roofing and siding, 24-gage and lighter, produced and delivered by a steel mill. Sheets galvanized by commercial galvanizers are excluded. Base period, upon which quotas will be determined, is the third quarter of 1946. Two premiums, "A" and "B", will be paid. Premium "A" will be paid on all shipments above quota. Premium "B" will be paid additionally on all shipments above quota delivered to distributors and consumers in the West Coast states if such shipments exceed amounts delivered to those states in the base period. If a producer fails to reach his quota in one month, the deficit will be added to his following month's quota unless the housing expediter finds the deficit was due to circumstances beyond the producer's control. The plan will be effective from Nov. 1 through June 30, 1947.

Carbon Steel Sheets: Include hot-rolled and cold-rolled carbon sheets (sometimes known as "black sheet"). Excludes tin plate, terne plate, black plate, alloy sheet and sheets used by the carbon steel sheet producer for galvanizing purposes. Base period, upon which quotas will be determined, is the third quarter of 1946. Premium will be paid on shipments above quota if (1) such shipments are delivered to the West Coast area and (2) are also in excess of shipments which a plant delivered to that area during the base period. If a producer fails to reach his quota in one month, the deficit will be added to his following month's quota unless the expediter finds the deficit was due to circumstances beyond the producer's control. The plan will be effective from Nov. 1, 1946, through June 30, 1947.

Premium payment plans already in effect include, in part: Merchant pig iron, cast iron soil pipe, nails, convector radiation and sand-lime brick.

Government Offers To Sell 63,000 Tons of Chrome Ore

U. S. Commercial Co., subsidiary of Reconstruction Finance Corp., is offering for sale, as agent of the United States and United Kingdom joint account, the balance of the stocks of chrome ore, amounting to 63,000 long tons, left in Turkey from the wartime preclusive purchase program.

Average Hourly Earnings Hit New High in Steel Industry

New high records for average number of employees and for average hourly wages of hourly, piecework and tonnage workers in the steel industry were set in September.

Average number of employees in September was 595,700, compared with 595,600 in August, according to the American Iron & Steel Institute.

The average hourly wage for September, the institute said, was 136.2 cents, compared with 134.6 cents in August and 123.4 cents in September, 1945.

The industry's wage earners worked an average of 37.5 hours a week during September, compared with 38.5 hours a week in August.

Total payroll for September was $139,625,600, a decrease from the postwar peak of $145,226,300 in August. In the first nine months of 1946 the steel industry paid its workers more than a billion dollars in wages.

WAA Offers Coal Mine, Coke And Steel Castings Plants

War Assets Administration is offering for sale or lease a coal mine and a coke plant, both located in the state of Washington, and formerly operated by Wilkeson Products Co. The coal mine has a rated capacity of 100,000 tons of coking coal a year. The coke plant, located at Tacoma, has a rated annual capacity of 75,000 tons of coke, 900,000 gallons of tar and 400,000 cubic feet of gas. It contains 17 regenerative coke ovens, coal handling equipment, steel hoppers, elevators, conveyors, etc.

The agency is also offering a modern steel castings plant in Shreveport, La., adaptable to general manufacturing.

Directory Lists 5000 Decontrolled Commodities

Chicago Association of Commerce has published a directory listing in alphabetical order the commodities suspended from price control. This directory, "Decontrolled Commodities," lists almost 5000 kinds of consumer and capital goods from which price control has been lifted.

GOVERNMENT CONTROL DIGEST

OFFICE OF PRICE ADMINISTRATION

Plumbing Fixtures: Maximum prices of enameled cast iron plumbing fixtures increased 11.5 per cent, effective as of Oct. 30. Price level is now 34 per cent above that of Oct. 1, 1941. (MPR-591; OPA-6914)

Decontrol: Effective Nov. 1, the following products are decontrolled: Alloy steel and tubing, steel wire rope and strand, alloy steel rolled products and alloy specialty steel, silver, trucks of a maximum gross weight rating over 16,000 pounds, two-ton or larger commercial truck trailers designed for on-the-highway use, radio parts and compounded medical prescriptions. Iron ore shipped on or after Jan. 1, 1947, is also decontrolled.

Other items decontrolled include: Farm machinery, including churns, ice-refrigerated milk coolers, milking machines, cream and milk separators, some hand-operated sprayers and dusters; specified gasoline and diesel engines and particular sizes of pumps; specified electrical equipment, including certain incandescent lighting fixtures for industrial and commercial use but excluding fluorescent fixtures; particular sizes of conduits, ducts and fittings for electrical uses; metal products, including fluid milk shipping containers, wire reinforcing fabric for use in articulated concrete mattresses for revetments; school and passenger bus bodies and equipment parts; nickel products and special alloys of nickel, chromium, iron, manganese and copper used principally in heating elements of electrical appliances; forged steel parts and attachments for boilers; specified construction machinery and equipment. (SO-129; OPA-6920 and 6923)

CIVILIAN PRODUCTION ADMINISTRATION

Inventories: Inventory restrictions on several scarce materials ranging from soda ash to radiators tightened. Receipts of iron and convector-type radiation cut from a 60-day to a 45-day supply, or a practicable minimum working inventory, whichever is less. A 30-day, or practicable minimum working inventory, restriction is also placed on receipts of bismuth and bismuth alloys containing 50 per cent or more of bismuth, as well as certain alkalies, caustic soda, soda ash, bicarbonate of soda, sodium sesquicarbonate, sodium silicate and sodium phosphates. (PR-32; CPA-LD-390)

Priorities: Priorities assistance on steel and iron castings for the veterans' housing program revised so that all unfilled "CC" ratings assigned by CPA and accepted by a supplier during the fourth quarter on application form CPA-4491 will be valid in the first quarter. The list of housing products on which priorities aid will be available has been revised. (PR-28; CPA-LD-383)

Housing Products: Priorities assistance for the procurement of steel to be used in housing products has been amplified to include wash basins up to 24 inches wide compared with the former maximum size of 22 inches. (PR-28)

Windows of Washington

By E. C. KREUTZBERG *Washington Editor, STEEL*

Observers feel new Congress is likely to move slowly in enacting labor legislation. Numerous bills seen introduced and extensive debate is anticipated but considerable delay in passing corrective legislation is indicated

DESPITE changes in the make-up of Congress resulting from the elections of last Tuesday, no fundamental change in attitude regarding the country's foremost domestic problem—industrial relations—is in sight.

Many labor bills will be introduced and the *Congressional Record* will bulge with debate on the subject but the Eightieth Congress is not likely to remove inequities from the Wagner Act unless forced to do so by another succession of strikes and a resulting wave of public indignation.

Such is the majority opinion of authorities in Washington vitally interested in labor legislation, including a number who help write labor bills.

The reason: Both the AFL and the CIO are opposed to putting any more labor legislation whatever on the statute books—and the presidential election year of 1948 now looms ahead. These two great labor organizations hold that industrial peace cannot be legislated; it must stem from collective bargaining in good faith. They admit some strikes are caused by stupid tactics of leaders of individual unions. Other strikes, they claim, are caused by failure of management to work honestly and wholeheartedly with the unions. There will be fewer strikes from these causes, they feel, as incompetent or insincere men benefit from the lessons of experience or are weeded out.

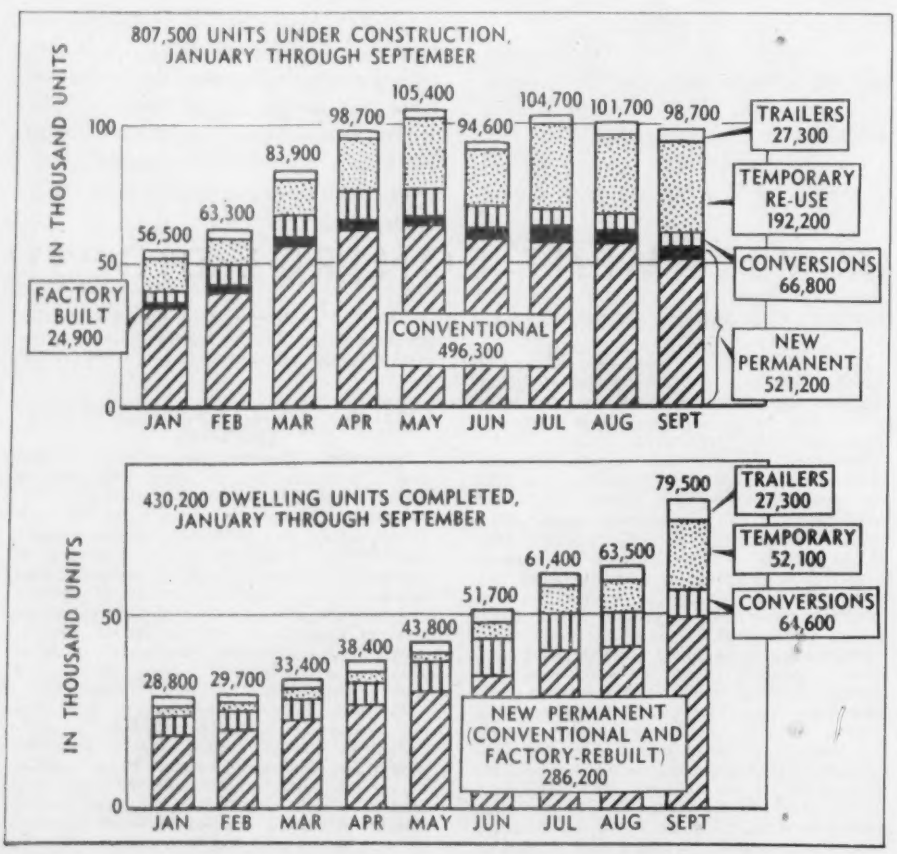
In fact, there is a growing feeling among labor leaders that the time rapidly is coming when no labor laws will be needed. That will be when management and unions become completely cooperative. Labor leaders think that time will arrive soon, since strikes are costly to both industry and labor and usually serve only to postpone the ultimate settlement. In their inner council meetings, AFL leaders have swung to the belief that eventual repeal of the unAmerican Wagner Act is only a matter of time.

The pellmell rush of the Truman administration to abandon controls reflects the trend in the current thinking. The AFL at its Chicago convention moved in favor of price decontrol, except rents, as a logical position to support its previous demand for decontrol of wages. CIO leaders unofficially—in advance of their coming convention this month—have taken the position that wage control should be eliminated at once and price controls removed "as supply and demand come into balance" in the key product lines. Therefore, the current White House policy is to get rid of controls as fast as it can. The aim is to get the White House out of the labor relations business as completely as possible in advance of the wave of wage demands expected in the closing weeks of 1946 and the early months of 1947.

Railway Labor Act May Be Guide

If the Eightieth Congress is forced to act, what sort of legislation will it pass? Generally, congressional advisers are favorably impressed with the manner in which the Railway Labor Act has served. This act has a code of collective bargaining rules that was agreed to beforehand by both management and labor in the railroad industry. The trouble this year, it is pointed out, did not result from failure to follow these rules; rather, it developed after the dispute reached a stage where the rules no longer served. In the event that a move is started to develop a comparable set of collective bargaining rules for industry outside the railroad field, the experts believe, exhaustive hearings and the lapse of many months will be required before the necessary agreement between labor and management representatives could be arranged.

It is the matter of enforcement that causes most concern to those who would take part in formulating new labor legislation. Labor is radically opposed to revival in any form of the labor injunction, and does not want the Norris-LaGuardia Act weakened in any way. Hence there always has been doubt about effective enforcement of the compulsory arbitration features of the Ball-Burton-Hatch, Case, Auchincloss, the two Smith and other bills. As one authority puts it, "you can put a few labor leaders in jail but you can't put striking workers in jail by the thousands—and the labor



HOUSING PROGRESS: These charts prepared from data in Housing Expediter Wyatt's October report on the Veterans Emergency Housing Program show, top, the number of new dwellings started in the first nine months, and, bottom, the number completed. Charts by NEA

The CONE AUTOMATIC MACHINE COMPANY sees many GOOD THINGS AHEAD

It is reported that . . . . . .

A. O. Smith's new plant at Kankakee will have the largest radiant heating plant on record. Water, heated to 140 deg. by 120 separate heaters will circulate through 40 miles of pipe laid in the floor slab.

get ready with CONE for tomorrow

The making of acetylene from natural gas is being studied and reports may be expected from the Department of Commerce.

get ready with CONE for tomorrow

Muncie Gear Works proposes to market a "reverse cycle" heating plant this year.

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Truck bodies of magnesium are being made by Barry and Bailey Co. of Philadelphia.

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Blue Mountain Clay Co. of Memphis makes a new oil, grease and water absorbent for oily and wet floors that is said to absorb 120% to 140% of its weight.

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The Public Health Service announces that satisfactory substitutes for mercury have been found that end the hazard of mercury poisoning (the origin of the term "mad hatter") in the hat making industry.

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In a new thickness gage, designed by Glenn L. Martin Co., a dial registers the deflection of a sheet of metal when a predetermined vacuum is created on one side of it.

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The idea of the variable pitch propeller has been applied to industrial fans by Evans Products Co. Operated by a built-in thermostat, it maintains constant engine operating temperature.

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An electrically conductive, nonsparking linoleum has been introduced by Congoleum-Nairn.

General Electric has patented a new type of household refrigerator which maintains temperature at two levels simultaneously.

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The Bureau of Mines has recently released information on its process for the electrolytic method of producing manganese.

get ready with CONE for tomorrow

Pullman-Standard has increased its output of car wheels ten times by using a machine which revolves the tool instead of the wheel.

get ready with CONE for tomorrow

National Tube Co. claims that its new plant at Lorain, Ohio, is the world's first straight-line seamless pipe mill. It produces 2,000 feet of seamless steel pipe per minute.

The Office of Technical Services of the U. S. Dept. of Commerce reports on a silver-magnesium solder that can withstand the heat of gas turbines.

get ready with CONE for tomorrow

"Multi-tule", a profile blade type form tool holder, is to be made available to users of a well-known make of multi-spindle automatic lathes. The holder is particularly adaptable to short runs and cuts down time in tooling change-overs. It reduces the number of holders ordinarily required for a number of jobs.

get ready with CONE for tomorrow

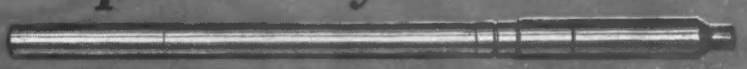
Dr. Baetjer, of Johns Hopkins University, prophesies that by 1950 one in every three women over fourteen will be employed in industry.

get ready with CONE for tomorrow

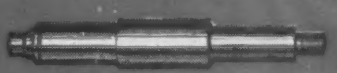
The *USS Salem* and *USS Newport News*, now being built, will be the first ships in what is promised to be a completely air-conditioned Navy.

FOLLOW THESE PAGES FOR NEWS OF PROGRESSIVE PRODUCTION

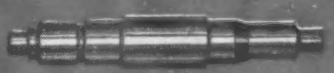
Emphatically Conomatic!



25⅝" long, 16 operations in 63 seconds from 1⅜" dia. hot rolled.

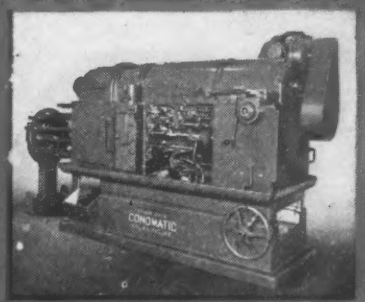


10⅞" long, 16 operations in 65 seconds from 1 $^{41}/_{64}$" dia. SAE 4620.



10⅝" long, 12 operations in 54 seconds from 1⅝" dia. SAE 3115.

Any good multiple spindle automatic should handle the ordinary run of shaft work. But Conomatics are also adaptable to the unusually *tough* jobs. The illustrations show this plainly.



Ask your CONE *representative to show you our new color motion picture*

CONE

AUTOMATIC MACHINE CO., INC. ★ WINDSOR, VERMONT, U.S.A.

35

leaders generally can so manipulate their activities as to keep out of trouble."

So that even if the Eightieth Congress feels itself compelled to pass a law to prevent public emergencies because of utilities and service industry strikes, the matter of providing for enforcement will prove difficult. Here again it may be necessary to get the approval of labor leaders.

Many of those legislators who voted for the Case bill have changed their minds. Employers who at first were enthusiastic about it have told them that one objectionable result of the Case bill would have been the setting up of another great bureaucracy in the field of labor, with somewhat unpredictable consequences. Legislators have found that the idea of using fact-finding panels or commissions is not popular with either labor or management because the findings of the panels are so often colored in accordance with the individual views of the members. Legislators have learned of many more cases where socalled "cooling-off" periods actually have served as "warming-up" periods; hence the action of the Seventy-ninth Congress in voting the National Labor Relations Board out of the strike-vote business was not a flash in the pan.

These are some of the reasons why Washington observers do not expect the Eightieth Congress to be in a hurry to enact new labor legislation after it convenes in January. What is expected is that the Congress, after it decides what portion of the LaFollette-Monroney "streamlining" law to accept in setting up its organization, will arrange for a thoroughgoing study of industrial relations. Much of the ground to be covered is new, so that it will take many months to complete the job; the main effort will be to determine such policies as the unions will support.

Warn Against Slump Talk

Administration leaders are worried by the general expectation, based on the recent sharp recessions in the securities and cotton exchanges, and on the fact that production has caught up with demand for many products which only recently were still scarce, of a slump in the economy early in 1947.

John D. Small, CPA head, warned at his press conference recently against "talking ourselves into a depression." This same thought was brought out the next day by Secretary of the Treasury John W. Snyder. He told his press conference that Americans should not talk hard times when the future looks good. W. Averell Harriman, the new secretary of commerce, struck the same note in a speech before the *Herald Tribune* Forum in New York on Oct. 30. Mr. Harriman classed as defeatism the fact that "many people in this country seem to feel that we are doomed somehow to face another great bust—and seem reconciled to disaster ahead."

Mr. Harriman in this speech made only a brief reference to a concept that has occupied his mind largely since taking his new post. That is that to maintain full production in the United States "careful planning and action by the government" is necessary. Current expectations are that not only the President's new Council of Economic Advisers, but Mr. Harriman will have a potent voice in setting forth the program to be advocated by Mr. Truman when he makes his report to Congress in January.

Arbitrators Win Approval

Sometime this month the United States Conciliation Service will release a list of arbitrators who by their records have won the approval of labor and management. The names were furnished by the Labor-Management Advisory Committees in the different parts of the country whose membership in all cases consists of two people named by the American Federation of Labor, two by the Congress of Industrial Organizations, two by the National Association of Manufacturers and two by the Chamber of Commerce in the community. This list, containing about 100 names, will be gone over finally at a meeting of the national Labor-Management Advisory Committee on Nov. 12 in the Labor Department Auditorium. The Conciliation Service regards the setting up of this list as some sort of a landmark in the development of arbitration as a tool for settling labor disputes. Availability of these 100 men and women, who have won prestige with both labor and industry by reason of the decisions they have handed down in the past, is expected to bring about much wider voluntary resort to the use of arbitration.

Lead Toys Cause Protest

Newspaper advertisements featuring department store offerings of lead toys made in Great Britain and imported for sale during the Christmas season may prove to be the straw that will break the back of the lead shortage. The petroleum industry has entered a strong protest with the State Department. Other lead consumers, particularly the battery manufacturers, will follow suit. Their attitude is that there is something wrong when the British can make solid lead toys for export while we have less than enough lead to fill essential demands.

While full details about the State Department's lead deal with foreign powers never have been revealed, the understanding is that the United States is free to buy lead only in the western hemisphere. Petroleum and battery men pointed out that a slight increase in price would swell Mexican lead production still further, and that lead could be had from Argentina. They also ask what prevents the purchase of surplus lead accumulated in Spain, North Africa, and Australia. These industries take the position that if lead were to be given a free market by the CPA and OPA, the manufacturers would quickly find and bring in enough of this metal to cure the shortage.

The petroleum industry also has protested to the CPA against the present priority system which prevents it from getting enough cans. Principal ammunition is a late Department of Commerce report which shows big inventories of canned foods such as juices. In the opinion of the petroleum industry the need for priority to ensure a can supply for the food industry has completely disappeared.

See Another Explosion

The sugar industry has accumulated some information which tends to indicate our international sugar policy is less than fair to American consumers. Several foreign countries evidently are getting so much sugar they have been able to use it in large quantities in the manufacture of food products for export. If additional information now being gathered supports the initial indications, says an informed individual, there will be another explosion of public indignation such as that which recently centered around meat.

Patent Lawyers Feel Better

To the joy of Washington patent lawyers—the number of whom is legion—all examining divisions of the Patent Office now have been brought back to Washington. But they cannot yet occupy their old quarters in the Commerce building specially designed for their purposes. They have been moved into Temporary Building No. 7 at Gravelly Point on the Potomac. There the principal difficulty is that the floors will take a safe load of only 55 pounds per square foot; the heavy files of the examiners must be spread thinly and even then the floors are sagging.

At Richmond, to which the examiners were moved to make room for war agencies in Washington, they occupied a tobacco warehouse which took a floor load of 291 pounds per square foot. But that was about the only advantage. Other factors, such as the housing situation and the delays in traveling to and from the main Patent Office quarters in Washington, presented difficulties.

Steel Shortage Limits British Auto Production

Builders have large order backlogs but proposed steel allocation is sufficient for only half of 1947 projected output

BIRMINGHAM, ENGLAND

AUTOMOBILE manufacturers have large order backlogs and recent government announcement that supplies of steel sheets will be drastically pruned has caused consternation in the industry.

Recently, Sir William Rootes, head of one of the big automobile groups, said that before the war almost 40 per cent of British steel output went to the automobile industry, whereas the proposed allocation would represent only 15 per cent, sufficient for only half of next year's planned production.

The minister of supply attributes the drop to the loss of imports and the enormously increased consumption for the present position as a result of which demand exceeds even the present enlarged rolling capacity.

Shortage of steel has caused closing of a works in the Birmingham district producing seamless drawn steel tubes.

September production data show steel output at an annual rate of 12,402,000 tons, which although better than the previous quarter did not reach the level of the second quarter when an annual figure of 13,111,000 tons was indicated. Pig iron also showed a similar decline at an annual rate of 7,660,000 tons compared with 7,828,000 tons in the second quarter.

Further expansion seems unlikely soon. Coal supplies have been curtailed and the fuel outlook is not encouraging.

Apart from the scarcity of steel sheets there is a scarcity of other products. Heavy structurals are in great demand although war rehabilitation work has scarcely yet started. Rolling mills have heavy order accumulations.

Special consideration is being given to shipbuilders on plate deliveries but according to the minister of supply "the maximum possible quantity of steel is made available for shipbuilding, having regard to other national needs."

Steelmakers are perturbed at the possibility of higher freight rates and in consequence higher production costs. Robert Shone, economic director of the British Iron & Steel Federation, recently said the proposed increased rates would mean a boost in the price of manufactured steel of 4s a ton. Moreover, the steel industry has already borne the burden of increased coal prices.

The position in regard to imports of semifinished steel has not improved. Some steel has arrived from America but much more is needed.

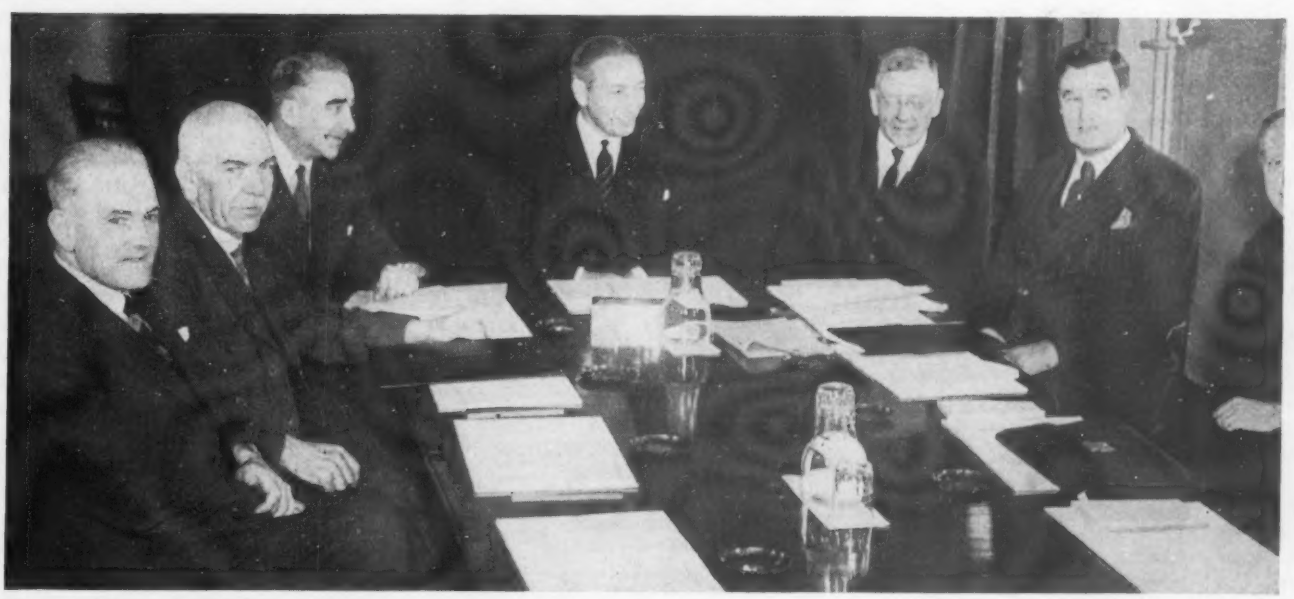
Labor shortages continue acute in British foundries, especially in those producing light castings needed in the housing drive.

Output of such castings is at an annual rate of only 2,500,000 tons against 3,300,000 tons in 1938. Allocations increased from 491,600 tons in the last quarter of 1945 to 568,060 tons in the third quarter of 1946 but total requirements increased from 669,880 to 839,989 tons and are estimated at 877,279 tons for the current quarter.

The Ministry of Supply, in co-operation with the Ministry of Labor and the Central Office of Information, on Nov. 1 opened a high-pressure campaign to recruit 20,000 foundry workers and the first objective is to obtain 10,000 for production of light castings. It is estimated the 1939 labor force of 140,000 is needed, entailing an addition of 21,600 to the number at the end of August. Up to that date it had increased by only 23,200 in 11 months.

Test Made with Locomotive Converted To Use Fuel Oil

British authorities are conducting tests of the first passenger locomotive in the kingdom to be converted from coal to oil burning, under a program experimentally using oil as a fuel because of the current coal shortage.



BRITISH STEEL BOARD: Members of the British Iron & Steel Board which will supervise development and modernization of the industry under the government's modified socialization plan are, left to right: Lincoln Evans, secretary of Iron & Steel Trades Confederation; A. Callighan, secretary of the National Union of Blast Furnacemen; A. C. Boddis, secretary of the board; Sir Archibald Forbes, chairman of the board; Sir Alan Barlow, joint second secretary of the treasury; G. H. Latham, chairman of the Whitehead Iron & Steel Co. Ltd., and president-elect, British Iron & Steel Federation; Richard Mather, chairman, Skinningrove Iron Co. Ltd.

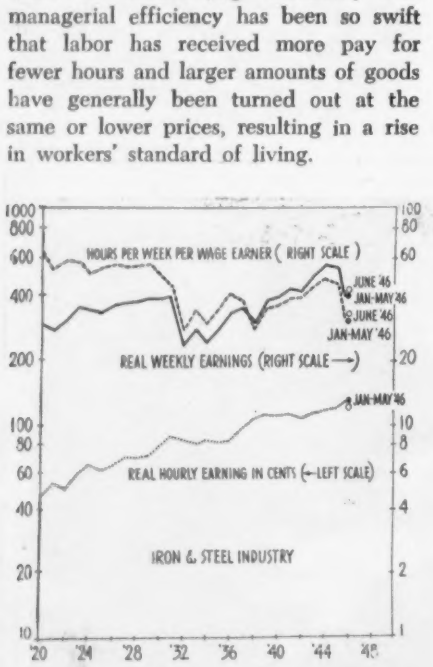
Rigidity of Payrolls Held Threat To Continuation of Free Enterprise

Management counselor sees danger in organized labor's new demands for further wage increases not accompanied by higher productivity, and for guaranteed wages or employment. Warns management to recognize limitations

IF THE free enterprise system is to continue, business must oppose the present trend toward rigidity of payrolls, said Dr. Donald R. G. Cowan of Donald R. G. Cowan & Associates, management counselors, Cleveland, in a recent address before the Iron & Steel Section, Controllers Institute of America, New York.

"It is important," he said, "that individual companies make thorough studies of the economics of labor and of marketing in order that when new demands are made for increased wage rates or for guaranteed work and wages the possibilities and limitations will be clearly defined for management's use in the crucial negotiations."

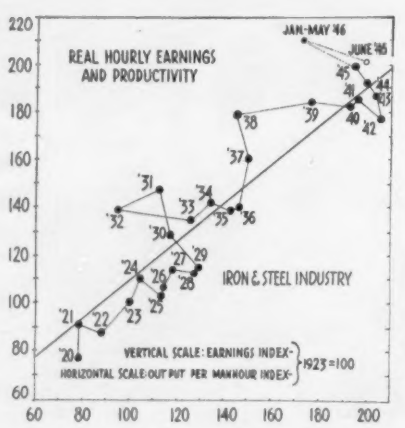
In his discussion of labor's wages and productivity, Dr. Cowan said the development of labor-saving machinery and managerial efficiency has been so swift that labor has received more pay for fewer hours and larger amounts of goods have generally been turned out at the same or lower prices, resulting in a rise in workers' standard of living.



Between 1923 and 1945, real wages per hour, allowing for changes in the price level, increased 99 per cent in the steel industry while real weekly earnings increased 53 per cent. From 1920 to 1945, the number of man-hours required per unit of output declined 6 per cent in the iron and steel industry.

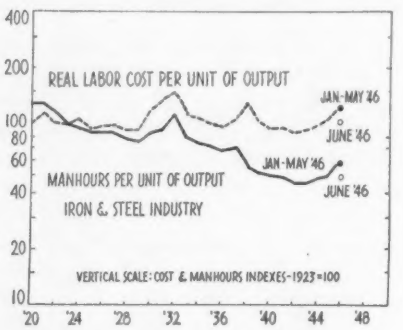
"Mechanical and technical progress is evidenced on every hand in steel making and fabricating," Dr. Cowan said. "As a consequence, the number of man-hours required to produce a ton of steel, an automobile, a refrigerator and a host of other raw materials and manufactured products has been greatly reduced. The resulting savings should be passed on to all consumers in lower prices, thus enabling all workers to buy more goods and services."

As output per man-hour has increased, real hourly earnings of labor generally have also increased. Result has been, he continued, that in manufacturing since 1920, the man-hours per unit of output have declined markedly while the real labor cost per unit of output has shown only a moderate tendency to decline. In the iron and steel industry, although man-hours per unit of output have shown a large decline since 1920, real labor cost per unit of output has shown only a slight downward trend. "It is plain," Dr. Cowan concludes, "that through higher wages labor has obtained the major benefit of mechanization."



From time to time, labor has obtained real wages that were either higher or lower than the normal relationship with productivity would warrant, he said. Labor's real wages were above this normal in the years 1932, 1938 and 1945 and below in 1928, 1936, and 1942.

In the iron and steel industry, output per man-hour reached its highest level in 1942 but in the first five months of 1946, owing to the steel and coal strikes, it was 17 per cent below the 1942 average. By June, 1946, output per man-hour had improved and was only 3 per cent below the 1942 average and about 16 per cent above the 1945 average. Real hourly earnings of steel labor were 14 per cent higher in June, 1946, than in 1942 and 1 per cent higher than in 1945.



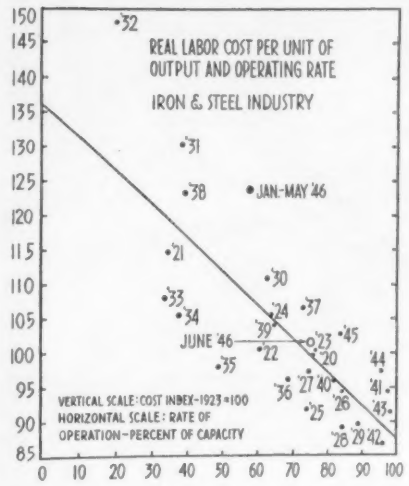
Wages and output per man-hour are important only as they affect real labor costs, Dr. Cowan explained. In the iron and steel industry, the man-hours per unit of output, which were lowest in 1942, had increased 6 per cent by 1945 and 20 per cent in the first five months of 1946, but in June, 1946, they were 2 per cent less than the 1945 level. Compared with 1942, real labor cost per unit of output was 19 per cent higher in 1945 and 42 per cent higher in the first five months of 1946. In June, 1946, however, real labor cost was 1 per cent less than the 1945 average, reflecting the effect of a shorter work week with overtime eliminated as well as steadier operations and recent improvement in productivity.

"The extraordinarily high level of labor cost per unit of output becomes more alarming when the level of production is considered," Dr. Cowan said. "With production difficulties and lower output in 1946, real labor cost per unit of output is the highest since 1932, while man-hours per unit of output have experienced the first important upturn after 25 years of fairly steady decline. Similarly, periodic declines in steel volume have brought about recurring high levels in both man-hours and real labor cost per unit of steel output, the peaks occurring in 1921, 1932 and 1938, with operating rates not over 40 per cent of capacity. Owing to the strikes in steel, coal and other industries, the real steel labor cost in 1946 to the end of May averaged 19 per cent higher than in 1945 while the operating rate dropped from 84 per cent to 57 per cent. In June, 1946, the operating rate was 75 per cent and the real labor cost was 17 per cent

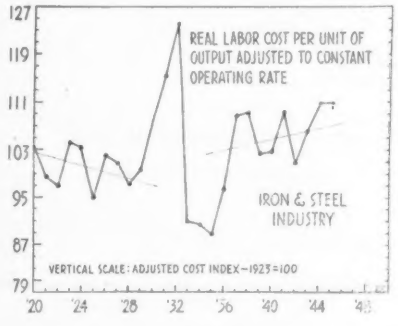
"Real" labor costs are those costs which would have been incurred if the general level of prices were constant. They are determined by dividing the actual costs by the Bureau of Labor Statistics wholesale price index. To enable management to make comparisons, the same index is used to compute "real" income, wages, and earnings.

Charts were prepared by Donald R. G. Cowan & Associates, Cleveland 14.

less than in the five months ending in May."


REAL LABOR COST PER UNIT OF OUTPUT AND OPERATING RATE
IRON & STEEL INDUSTRY
JAN-MAY '46
JUNE '46
VERTICAL SCALE: COST INDEX-1923=100
HORIZONTAL SCALE: RATE OF OPERATION-PERCENT OF CAPACITY

According to the relationship between the rate of operations and real labor cost per unit of output in the past 25 years, the real labor cost in the first five months of 1946 was 11 per cent above normal. "Putting it another way," Dr. Cowan said, "the real labor cost was at a level corresponding to an operating rate of 32 per cent of capacity, whereas the actual operating rate was 57 per cent. In June, 1946, the real labor cost was 3 per cent above normal at the operating rate of 75 per cent. In other words, the real labor cost in June corresponded to the normal cost for an operating rate of 70 per cent. It is obvious that while the steel industry's labor costs are above normal they are not as seriously out of line as some industries.


REAL LABOR COST PER UNIT OF OUTPUT ADJUSTED TO CONSTANT OPERATING RATE
IRON & STEEL INDUSTRY
VERTICAL SCALE: ADJUSTED COST INDEX-1923=100

"A further tendency of vital importance to the steel industry is the upward tendency in real labor costs in the past ten years compared with the downward tendency in the decade, 1920-29.

Consequences of high labor costs were listed as follows: (1) Rise in wages is necessitating large increase in working capital and fixed capital investments in machinery; (2) rise in labor costs has raised the break-even point in many industries and to between 70 and 80 per cent in the steel industry; (3) general increase in labor costs falls more heavily on some industries than on others because of differences in the relative importance of labor costs and other costs; (4) increases in real wages that are not attended by increases in output per man-hour cause higher prices and place industry at a disadvantage for the time being at least in selling its products in foreign markets.

It is apparent, Dr. Cowan said, that union success in bargaining for higher wages without guaranteeing to deliver a corresponding increase in productivity is fraught with serious consequences to business. Plans with unconditional guarantees of wages and employment are now being proposed by unions, but no company so far has felt its business operations and income so uniform and secure that it could offer such unconditional guarantees to its employees.

The following benefits are claimed from stabilized employment and income: (1) Elimination of fear of unemployment tends to increase output; (2) personnel turnover is likely to be reduced; (3) overhead costs per unit of output may be reduced; (4) once the plan is in effect, additional ways to stabilize employment may be found; (5) increased consumer goodwill and benefits in the merit rating under unemployment compensation laws may result.

"While all of these points are debatable in particular cases," Dr. Cowan said, "steel men may regard these advantages as far outweighed by the tremendous difficulties of applying a guaranteed wage plan in the steel industry. The fluctuating, unpredictable, and diverse demand for steel creates very serious operating, inventory, and financial complications in applying a stable wage program. The demand for steel is derived from the demand for the products of its customers and most of it is produced on order to meet an infinite variety of customer specifications. In peacetime about 10 per cent of the output is used in products such as tin plate which are associated with stable consumer demand, principally for food. The other 90 per cent goes into the making of many kinds of steel products of a durable nature, the satisfying of the demand for which may be postponed for periods ranging to a quarter of a century or more.

"It is very difficult to produce in anticipation of demand without incurring serious risk. This is because of the wide fluctuations in buying steel, the great variety of compositions, widths, thicknesses and finishes required for many purposes, and the widely scattered locations of numerous buyers. Although the demand for individual products fluctuates much more than the general operating rate, the latter has varied from a low of 20 per cent in 1932 to 98 per cent in 1943. . . . . In the steel industry it is much more difficult to accomplish what packers and others have done in shifting workers from one production department to another as a method of increasing continuity of work. . . . . If successful application of the annual wage in the steel industry can ever be accomplished, it will require solution of the marketing problems which it encounters and creates.

"The second difficulty, the size of the payroll, is very serious. For example, a guarantee of total man-hours worked in the year 1932 at the average rate of hourly pay for that year would cause the costs of 31 steel companies to exceed total sales by approximately 50 per cent in future peacetime years having a level of operations approximating the average of the years 1936 to 1939. To meet such a payroll it would be impractical to increase steel prices because customers would refuse to buy. The only alternative to bankruptcy of the industry would be a much lower rate of hourly pay for workers, the reduction representing the insurance premium for security of income. Similarly, the accumulation of reserves in good times to pay the guaranteed wages in periods of low steel demand must come from lower wage rates and payrolls in the good years, because the alternative of 50 per cent increase in prices would greatly reduce the amount of steel bought.

Steel Demand Governs Wages

"But, suppose that . . . the steel industry abandons its practice of producing to meet firm orders and, in order to provide full employment at guaranteed wages, accumulates an inventory in excess of sales in future years comparable to the 1936-39 period. The excess inventory at the close of the four years would amount to approximately $10 billion, as compared with actual sales of $8.7 billion in that period. Since it takes a very large decrease in steel prices to bring about a small increase in steel consumption, the threat of such accumulations of inventory would bring about precipitous declines in steel prices. The financial burden of the inventory, the added expense of $1 billion for warehouse facilities, the deterioration in the steel itself, and the price declines would bankrupt the industry. . . .

"Payroll and inventory resulting from a guaranteed work-wage plan in depression years like 1931 or 1932 would be ridiculously burdensome. It demonstrates very clearly that wages in the steel industry, whether guaranteed or not, depend on demand for steel rather than the reverse."

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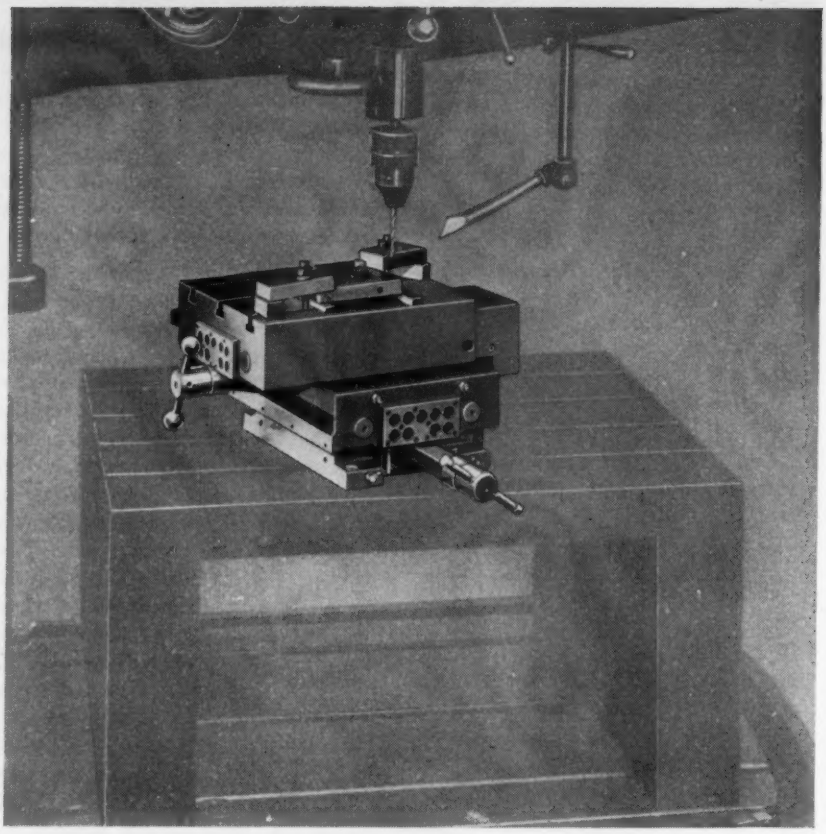
without JIGS

. . . . you can drill, bore, ream and tap . . . small work



The new 4″x 4″ Bullard MAN-AU-TROL Spacer for speedily and accurately locating holes within a 4″x 4″ area . . . for use on smaller sensitive drills but usable on larger drills as shown. Its hydraulic unit will operate four 4″x 4″ Spacers if you so desire.

. . . as well as LARGE WORK

The new 30″x 20″ Bullard MAN-AU-TROL Spacer for accurately repeating a pattern of holes within a 30″x 20″ area . . . for use on radial drills.

BOTH the 4″x 4″ and 30″x 20″ Bullard MAN-AU-TROL Spacers give you such benefits as: elimination of expensive jigs . . . no production tie-ups for making jigs . . . straight holes 90° to the work . . . prevention of strain on drill spindle and reduction of drill wear because of perfect tool centering . . . less operator fatigue. Write for MAN-AU-TROL Spacer Bulletin. The Bullard Company, Bridgeport 2, Connecticut.

Typical Installation of 30″x 20″ MAN-AU-TROL Spacer.

BULLARD

CREATES *NEW METHODS* TO MAKE MACHINES DO MORE

By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

Auto production men seek means to "let equipment set the pace" as remedy for low productivity of workers. Semiautomatic multiple spot welders being developed. Promise to yield important time-saving economies

DETROIT

LARGE doses of engineering brains are being applied to the automotive industry's malady of low worker productivity. How effective they may prove to be will have to wait probably until the advent of 1948 models late next summer but the master mechanics and production specialists are already in daily consultation with equipment builders trying to dope out ways and means to "let equipment set the pace" rather than let it be subject to the whims of workmen on the line.

Just one example which might be reviewed briefly is that of spot welding equipment. Efforts are now being made to develop and build semiautomatic multiple-spot welders which may be placed in proper sequence in the manufacturing operation, permitting the welding operation to keep pace with stamping presses and later assembly operations and avoiding the need for routing stampings out of the processing line to a welding department and then back to assembly. Under construction at Progressive Welder Co. here is a new line of what are described as multiple-point welding presses which, like stamping presses, are standard equipment except for the "tooling" or dies and which can accommodate models changes by simply switching the tooling.

They are vertical hydraulic presses for the spot welding of curved components such as hoods, rear deck lids, doors and other body elements. A lower supporting die, shaped to the proper curvature to receive the part, is installed on the lower platen of the press. The necessary welding guns are positioned at the proper height and angle on the upper platen, so that when the two meet the welding guns will contact the part at the proper spot and with sufficient pressure to make the weld when current is "shot" through the guns. When the design of the part is changed or another type of part is to be produced, the lower die and the welding guns are quickly removed and new "tools" installed.

Along the same lines, Progressive is now building two large welding presses for Kaiser-Frazer Corp. to handle the spot welding of front and rear floor pans for bodies. In the assembly of these stamped steel pans as many as 500 spot welds are necessary to attach the necessary bracing, brackets and other parts, and to join the front and rear units. One press welds 85 spots on the front pan, the second several hundred more spots on the rear pan and along the joint. Both these presses operate on the principle of lowering all guns to come in contact with the steel, then firing them in groups of four through automatic electric cycling devices. One important advantage of lowering all guns into contact with the part is that less pressure per gun is required to hold pieces into contact. A further feature of these floor pan welders is the use of two reciprocating tables on which the various pieces to be welded are assembled and then traversed into the press under the welding guns, while the other table is being unloaded and a new set of parts positioned.

This type of equipment, built in a variety of styles and sizes, is an exceptionally fast method for multiple spot welding and is particularly adaptable to automotive requirements. In fact, its design has been evolved by engineers thoroughly schooled in the automotive manufacturing philosophy. Production rates of 100 or more pieces per hour are easily achieved, suggesting the possibility of the machines outrunning the pace of other equipment in the plant, or at least being in excess of optimum demand. Obviously the cost of the welding press could not be justified in a plant where the welding speed was far beyond the overall production pace, but on the other hand in parts plants they might yield important time-saving economies which could lead to the manufacturer taking on additional business.

A major difficulty in trying to "let equipment set the pace" lies in persuading operators to use the equipment at its designed production rate, or even to make reasonable use of a machine's capacity. A typical case in point is in the plastic molding department at Ford where distributor caps for ignition systems are molded. A large press is used, with a mold containing five cavities into which are fitted individually assembled molds and inserts for the caps. The machine functions on about a 25-minute cycle, representing the time elapsed between successive starts of the press on its downward stroke. About 12 minutes of this time is required for the actual molding or curing of the parts, the balance including time required to remove the five cavity molds, to break them and remove the parts, reassemble the molds and inserts and again position in the press.

An engineer suggested that if duplicate sets of cavity molds were available, the operator could use the curing time to assemble the second set, so that when the first group was removed the other could be inserted immediately and another cycle started. During the second cycle the operator could remove the first set of pieces and reassemble the molds. The Ford department chief readily agreed this might be possible, but added that if it were tried the operator would immediately register a grievance over a "speed-up" and eventually walk off the job. So here is a case where production probably could be doubled with no extra labor or equipment, beyond a duplicate set of molds, yet it is prevented by union pressure. More than engineering brains is needed to solve that one which, by the way, is no isolated instance.

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

Estimates by Ward's Automotive Reports

	1946	1941
January	121,861	524,037
February	83,841	509,332
March	140,777	533,878
April	248,318	489,856
May	247,620	545,321
June	216,637	646,278
July	331,000	468,897
August	359,101	164,793
September	342,727	248,751
October	411,386°	401,369
Total, 10 mos.	2,503,268	4,532,512
Estimates for week ended:		
Oct. 19	89,540	85,600
Oct 26	87,680	91,855
Nov. 2	93,268	92,879
Nov. 9	95,000	96,585

°Preliminary.

2.5 Million in Ten Months

Latest count of ten months' production of cars and trucks in the U. S. and Canada shows a total of 2,503,268 units, compared with 4,532,512 in the same period of 1941. October output was a new record for the postwar period, being estimated in excess of 410,096, the highest

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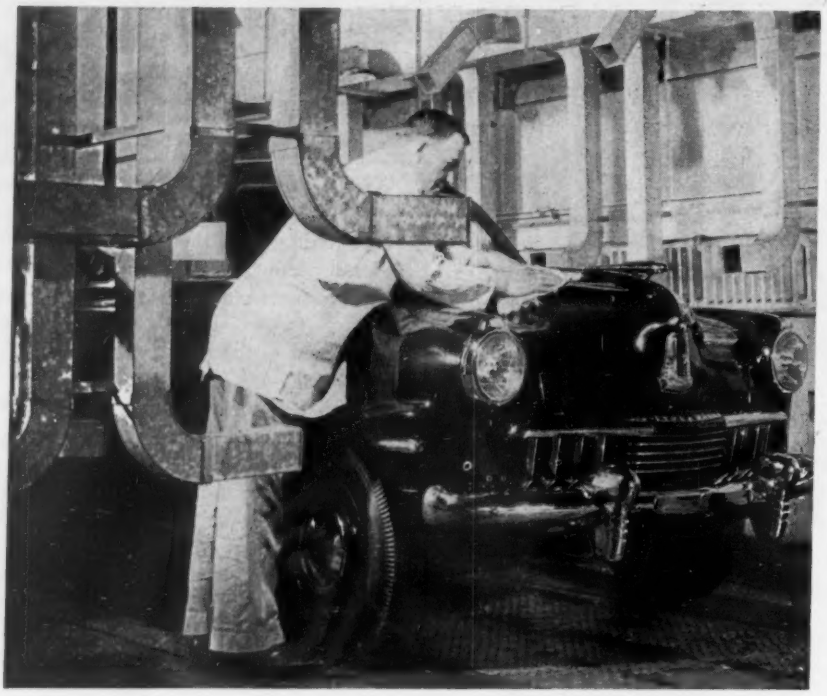

SPEEDS COOLING: To improve working conditions, Studebaker has installed batteries of air blowers along its conveyor system immediately at the end of paint touchup ovens. Apparatus speeds the cooling of sheet metal. High temperatures of bodies emerging from the ovens previously handicapped buffing and polishing operators

month of the year. November output now looks like 360,000, and December likely will be down to around 250,000. Indicated total for the year is around 3,100,000.

Parts Production Heavy

In reckoning the comparison of 1946 versus 1941 production, it must be realized the figures on unit output do not tell the whole story. There has been industry-wide concentration on fabrication of replacement parts, far beyond any level yet achieved. This business is forecast to attain a dollar volume of around $1.5 billion this year, or some $250 million more than last year when it was also of record proportions. The share of this total accounted for by the major motor car builders has been stepping up importantly, just how much does not appear readily discernible. One authoritative source estimates 35 per cent of the automotive industry's capacity is being allocated to replacement parts manufacturing. This has not been at the expense of the independent parts manufacturers who are themselves doing record volume, but it does indicate a level of automotive manufacturing considerably beyond what statistics on car and truck output indicate, both in total dollar volume and in profit, since the margin on parts is more comfortable than on the vehicles themselves.

It should not be inferred there has been any planned campaign to concentrate more on parts because of the improved profit possibilities. Demand for parts to keep the nation's automotive fleet going has been insatiable and despite record production there are many short items persisting.

GM Earns $27 Million

High volume of parts business may be a partial explanation of the encouraging financial statement reported by General Motors for the third quarter, when an operating profit of nearly $27 million was shown on total sales of $622,618,885, or about 4.3 per cent. To the operating profit was added an estimated tax credit of around $7 million, giving net income equivalent to 71 cents per share of common stock after the regular $1.25 dividend on the preferred. For the corresponding quarter of last year, income was equivalent to 78 cents a share on the common. Common dividend of 50 cents was declared, bringing up to $1.75 the total declared this year.

The picture is not quite so bright when operations for the first nine months of the year are reviewed. After giving effect to tax carrybacks, net income was equivalent to only 16 cents a share on the common stock, compared with $3.20 per share in the like period of 1945. There has been a sharp decline in GM working capital over the past year, from about $917 million to $663 million. Cash and government securities declined from about $516 million as of Sept. 30, 1945, to $160 million at the same time this year. Net working capital in the first nine months was bolstered by proceeds of a $125 million long-term note issue placed with a group of insurance companies. The major item accounting for decrease in working capital was of $242 million for plant facilities and special tools. Precipitate increase in inventories was registered over the past year, from $322 million to over $549 million.

Packard Suffers Loss

Packard's nine-month statement was not so pleasant, revealing an operating loss of over $6 million, converted to net earnings of $1,387,316 by application of tax carrybacks, nonrecurring credits, transfer of funds from wartime reserves for reconversion and a profit of $1,409,465 from subsidiary operations in the car and service selling field.

Chevrolet Revives Light Car

Latest word on the Chevrolet light car, scheduled for building eventually at Cleveland but deferred by action of GM in September, suggests the project has been reactivated. Certain equipment builders have been told they may figure on initial shipments of tools six months from next March, but with Chevrolet holding the privilege of canceling before that time. The March date represents about a six-month deferment from the date of the original suspension this summer. On this timetable the earliest the light Chevrolet could hit the market would be spring of 1948.

Plenty of Steel

Reversing the complaints heard from most automotive producers, J. W. Frazer of Kaiser-Frazer Corp. says his company has steel "sticking out its ears," and in sufficient quantity to permit an assembly rate of 1000 cars per day (present rate around 130 daily).

Self-Defrosting Glass

A new type of insulating and self-defrosting safety glass windshield is being offered at extra cost on certain Chrysler models. The glass is a combination of Nesa and Solex types, developed by Pittsburgh Plate Glass Co. The former has a thin purplish film of conductive liquid on the surface through which 110-volt current is fed from a special generator-rectifier-transformer system to develop enough heat for defrosting. Solex glass has a small iron oxide content to absorb part of the sun's rays, reducing heat and glare coming through to the driver. It has a light greenish-blue tint.

VICKERS HYDRAULIC CONTROL means *Greater Productivity and Versatility* FOR ETNA Tube Cutoff Machines

Important advantages of Vickers hydraulic controls that make for higher production rates and greater versatility are illustrated by this Etna Hydraulic Tube Cutoff Machine. Completely automatic is the cycle which feeds the tubing rapidly and accurately to length within a few thousandths, provides quick action clamping, cuts off and then unclamps the stock. Feeding and clamping rates are varied by simply turning a dial . . . there are no cams or gears to change. The rapid traverse approach of tool slides and the rapid return save time. The machine is compact and completely self-contained; it is changed from one diameter of tube to another in a few minutes.

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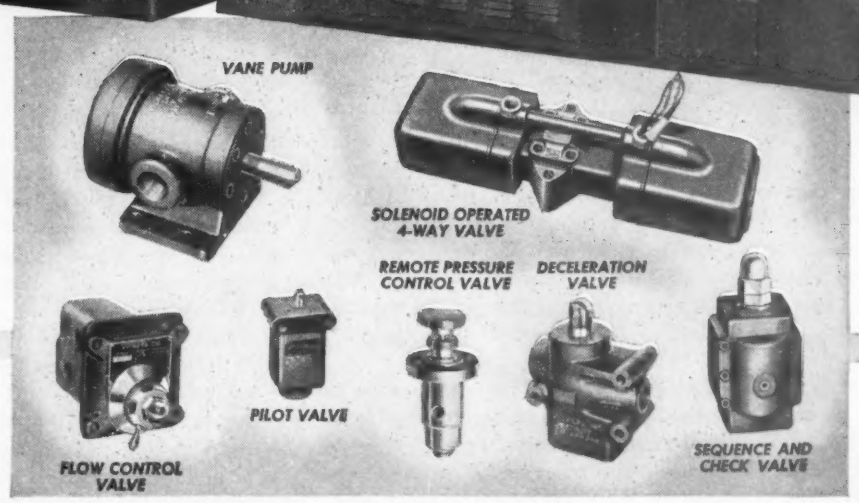


Representative Vickers Hydraulic Control Units used on Etna Tube Cutoff Machine

Stanley Workers Hold Open House In New Building

Twenty thousand visit plant in four-day program. Personnel executives note increase in applicants for jobs

WHEN the Stanley Works, New Britain, Conn., completed a two-year construction program recently, company employees, with the approval of management, staged an open house. For four days, employees' families and New Britain's citizens at large were welcomed to the plant and shown the products of all divisions of the company.

Twenty thousand people attended the open house. Each evening an entertainment was presented by the employees; officers of the company also took part in these programs, with President R. E. Pritchard speaking briefly and Vice President R. W. Chamberlain presenting a historical sketch of the company.

Several evidences of goodwill were noted immediately. Young visitors of working age were impressed by working conditions in the plant and Stanley personnel executives reported that after the first day of the open house applicants for jobs started calling at the employment office and filing their names for future employment.

The building program just completed includes five structures. One of these is seven stories high and provides 245,000 sq ft of manufacturing space for production of hardware articles. Another provides 136,000 sq ft for the electrical tool division. A third is for the manufacture of wire and rod products, a fourth for maintenance and repair of the company's motor fleet and a fifth for steel operations.

Stanley Works President R. E. Pritchard, at microphone, addresses guests at open house. At left is Vice President R. W. Chamberlain

Dresser Executive Reports French Gas Field Expansion

Recently returned from a four-week trip to England and the continent, John B. O'Connor, executive vice president, Dresser Industries Inc., Cleveland, reports a sizable gas field development under way in southern France and considerable activity in Czechoslovakia where he visited a large coal gasification plant where synthetic gasoline and fuel oil are being made by reducing coal with oxygen.

Shortage of solid fuels in France, Mr. O'Connor said, is providing an impetus for exploration and development of the French gas fields. A company jointly financed by government and private capital has completed two pipelines and more are under construction.

Two Dresser companies are shipping equipment for this program—International Derrick & Equipment Co., Columbus, O., which is supplying drilling equipment, and Clark Bros. Co. Inc., Olean, N. Y., which is manufacturing compressors.

NHA Efforts To Find New Home Builders Protested

Accusing certain National Housing Agency "planners" and "visionaries" of scouring the country to get big interests into the housing field when well-established prefabricated housing producers are unable to work at capacity because of materials shortages, Harry H. Steidle, manager, Prefabricated Home Manufacturers' Institute, presented the views of the industry in a letter to the American Legion Housing Committee, which began hearings Nov. 4 on the status of veterans' housing.

"Two hundred producers of well-engineered, highly acceptable, FHA-insurable prefabricated homes with all the necessary manpower and equipment for the year-round production of 300,000 houses on a single-shift basis, are working at roughly 20 per cent of their capacity," Mr. Steidle declared.

Citing established prefabricators who are unable to get aluminum or steel windows, kitchen cabinets, light steel joists or trusses and other metal parts because of the already short supply of these products, Mr. Steidle said that the government program "will slow down house production, retard the progress of home prefabrication and increase their cost to veterans."

He emphasized that prefabricators do not require financial aid nor guaranteed markets; their homes have public acceptability, insurability, and mass-production methods; and that the course proposed by NHA visionaries will be infinitely more expensive to home owners and taxpayers alike, and much more doubtful as to accomplishments.

Lengthened Tire Life Seen From Use of Steel Wires

Heavy-duty tire users may look forward to longer life for tires in the future because of a war-developed use of steel, according to the American Steel & Wire Co., Cleveland. High tensile steel wire, .0059 in. thick, is being woven into strands and laid around a central core to form rubber-coated cords used for tire construction. It is said four metallic plies are equivalent in strength and durability to approximately 20 fabric plies commonly used in heavy-duty tires.

The metallic ply is said to be highly resistant to punctures, bruises and blowouts, and the thinner structure provides greater resilience and eliminates creation of a large amount of heat in the tire.

Future uses of the rubber-encased steel wires may be reinforcement of V-belts, power transmission belts and conveyor belts, where strength and endurance must be combined with a high degree of flexibility, according to the steel company.

BRIEFS . . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

H. K. Ferguson Co., Cleveland, has developed a steel frame, fire resistant factory building which, the company says, can be built at a cost of $3 per square foot. Using standardized components throughout, the building combines simplicity of building design with simplicity of erection.

—o—

B. F. Goodrich Chemical Co., Cleveland, has entered the biochemical field and several new chemicals will soon be ready for commercial introduction.

—o—

Stewart-Warner Corp., Chicago, has begun production of a new house heating unit at its Indianapolis plant, which is expanding its capacity by conversion of a plant used during the war for manufacture of gears.

—o—

Battelle Institute, Columbus, O., under sponsorship of the American Iron & Steel Institute, has begun a study of "shelly" rails, a failure of rails in which pieces of metal breaking from the corner of the rail head necessitate replacement of the entire rail.

—o—

Carbide & Carbon Chemicals Corp., New York, will soon begin construction of a plant to manufacture butyl alcohol, extensions to facilities for production of industrial organic solvents and antifreeze compounds, and additions to shop, laboratory and service buildings near Texas City, Tex., as part of a $15 million expansion program.

—o—

American Blower Corp., Detroit, has designed a new model home ventilator which is also suitable for installation in most private offices.

—o—

General Motors Corp., Detroit, is expected to resume full-scale construction of its projected Parma and Brook Park, O., plants in the spring. The plants are expected to cost about $65 million, including equipment, and will employ up to 15,000 people.

—o—

Granite City Steel Co., Granite City, Ill., has opened a new sales office in Memphis, Tenn.

—o—

Southern Aircraft Corp., Garland, Tex., has achieved mass production at a rate of 25,000 a month of circulator type gas space heaters made of aluminum with stainless steel burners.

—o—

Haskell & Barker freight car plant, Michigan City, Ind., Pullman-Standard Car Mfg. Co., Chicago, has put in operation a mobile two-way radio telephony station in order to expedite switching and materials handling in its freight yards.

—o—

Protective Coatings Corp., Belleville, N. J., has issued a brochure describing products for protection of materials in transit and storage.

—o—

Monroe Auto Equipment Co., Monroe, Mich., has instituted a system of quality control by which the product designers and the tool designers inspect the final product and report directly to the company's management.

—o—

Aluminum Co. of America, Pittsburgh, in co-operation with Carsten & Iversen, Brooklyn, N. Y., has designed two portable conveyor units of aluminum which have been put into service by Brooklyn Waterfront Terminal Corp.

—o—

American Chemical Society, New York, has been notified by Dr. Marston T. Bogert, of Columbia University, that 21 nations will participate in rebuilding the International Union of Chemistry. The union, of which Dr. Bogert is president, was suspended during the recent war.

—o—

International Business Machines Corp., New York, has developed an electronic multiplication machine employing the punched card principle. The multiplying unit has no moving parts and is activated by vacuum tubes.

—o—

General Electric Co., Schenectady, N. Y., has established two aviation divisions from sections of its Apparatus Department's Industrial Divisions. The divisions are: Aircraft Accessories & Ordnance Division, Schenectady; and Aircraft Gas Turbine Division, Lynn, Mass.

—o—

National Merchandisers, Chicago, has announced a marketing service for inventors by which the organization will conduct engineering analyses, market surveys and invention sales of new products.

—o—

Thermador Electrical Mfg. Co., Los Angeles, has purchased Rotom Mfg. Co., Alhambra, Calif., manufacturer of fractional horsepower electric motors.

—o—

Fruehauf Trailer Co., Detroit, has begun production of the Fruehauf Flyer, a new 18-foot trailer designed for city operation. It is a fully enclosed truck with aluminum panels.

—o—

National Works, McKeesport, Pa., National Tube Co., smashed all its records in basic steel production and seamless steel pipe manufacture in October. To celebrate the event, the plant hoisted a broom atop its flagpole to indicate a "clean sweep."

—o—

Polymer Corp., Reading, Pa., has begun production of nylon rods which can be machined successfully. The rods, which are extruded in sizes from ⅜ to 2 in. in diameter and from 2 to 4 ft in length, are made from Du Pont FM-1 nylon molding powder.

—o—

Graham-Paige Motors Corp., Willow Run, Mich., has designed a reverse gear for its Rototiller farm machine. The gear is housed in a small unit which can be attached to a machine already in use.

—o—

Rust Engineering Co., Pittsburgh, recently presented watches to 19 employees who have been with the company for 25 years or more. Service pins were presented to 100 others who have 10 or more years' service with the company.

—o—

Allis-Chalmers Mfg. Co., Milwaukee, will hold a press preview at the Army arsenal, Picatinny, N. J., Nov. 14, to display its recently installed 20-million volt Betatron x-ray machine.

—o—

Platers & Stampers Ltd., English subsidiary of Ekco Products Co., Chicago, has acquired a government-owned manufacturing plant at Derby, Eng., which was built for the manufacture of ammunition components.

—o—

Drake Steel Supply Co., Los Angeles, has completed new offices and warehouse at Fresno, Calif., which contain 15,000 square feet of inside storage and five acres of outside storage space.

—o—

Bell Aircraft Corp., Buffalo, has plans to purchase the plant it now occupies at Wheatfield, N. Y., from War Assets Administration. Under its lease agreement with WAA, Bell reserved the right to buy the plant for $4,295,000.

—o—

Carnegie-Illinois Steel Corp., Pittsburgh, has transferred sales of concrete bars to its Specialty Products Division, Pittsburgh, and has discontinued its Concrete Bar Division.

—o—

Pennsylvania Flexible Metallic Tubing Co., Philadelphia, has begun publication of a house organ called "Penflex News."

Maritime Strike Throttling Industry

Pacific Coast manufacturers severely hit by shortages of materials which are being intensified by shipping tieup of needed supplies

SAN FRANCISCO

THE WEST COAST, already seriously restricted by the scarcity of many raw materials, is being throttled more by transportation bottlenecks and strikes.

Most serious immediate threat to many manufacturing industries is the strike of maritime workers, now in its fifth week. By tying up all waterborne traffic, the ship strike is a serious menace to all factories dependent on imported raw materials, and in addition is having a widening effect on other activities.

For example, building construction is being delayed even more because of the labor trouble. This is particularly true for types of construction dependent on steel.

Bethlehem Pacific Coast Steel Corp. is reported to have 42,000 tons of steel items, including nails, sheets, pipe and structural products, tied up on four ships. Columbia Steel Co. reported it has about 7000 tons of sheets and other steel items on eight ships which can't be unloaded until the strike ends.

Both of San Francisco's large sugar refineries have been closed by the strike, which has halted deliveries of raw cane sugar, and coffee plants in this area have reduced operations.

Plants using fats and oils, such as copra and linseed oil, have been curtailing because imports of those materials have been cut off.

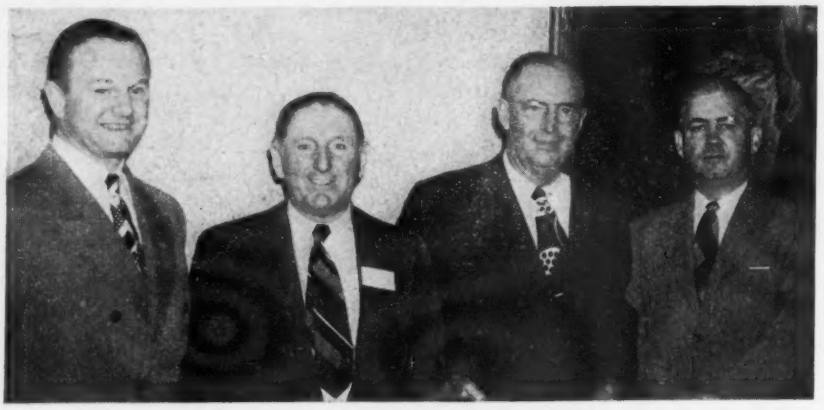
Lumber Shortage Increases

Lumber also is reported to be scarcer than ever because of halting of waterborne lumber shipments and inability of railroads to handle the extra traffic.

Meanwhile, the West Coast, which is dependent on eastern factories for much of its finished durable and consumer goods, is feeling some pinch from the railroad bottleneck. A number of industries on the coast which operate on components supplied by eastern firms also report delays in rail shipments.

Partly this is a reflection of the added burden placed on the railroads by the shipping strike, partly by the shortage of freight cars, and is partially the result of the increase in shipments of goods following decontrol steps.

Another factor on goods originating in New York is the trucking strike in that city, which has halted or delayed shipments of materials to other parts of the country. Chiefly the New York embargo is being felt in retail lines more seriously than in manufacturing industries.



FOUNDRYMEN: Pictured at the national officers' meeting of the southern California chapter of the American Foundrymen's Association are, left to right: George Dreher, Rogers Pattern & Foundry, a director of the AFA; Robert Gregg, Reliance Regulator Co.; S. V. Wood, president of the AFA; W. W. Maloney, AFA secretary and treasurer

Although the current transportation troubles will be cleared up eventually when strikes end and freight car supplies become greater, many West Coast industrialists believe it will take considerably longer to settle the most serious shortage—that of steel.

As a means of breaking the steel famine crippling West Coast fabricating shops and hampering steel-using industries, the California State Chamber of Commerce has gone on record as favoring removal of all price controls from steel and steel products.

Removal of such controls, the chamber says, may result in higher steel prices temporarily, but it will also stimulate production. Larger output, in turn, will bring about the quickest return to competitive conditions and resultant normal prices in the steel industry, the statement said.

"There is an acute shortage of steel and steel products throughout the United States, but this is greatest on the Pacific Coast," Adrien J. Falk, chairman of the state chamber's industrial committee, said. "Already some California sheet metal fabricating plants have been forced to close, owing to material shortages.

"OPA price controls for West Coast points do not reflect the freight differentials in shipments from the East. Under present price regulations, eastern markets afford a better net return to eastern steel producers. Naturally, those markets are favored.

"Ending price controls on all steel and steel products will permit these freight differentials to be reflected in price. This will enable California industry to obtain steel on a competitive basis, and secure its full share of the national steel production. Price control removal will open the way for the Pacific Coast to secure urgently needed steel and steel products now and hasten the steel industry's swinging back into normal balance under which California users will receive their proper share."

The state chamber's steel action follows its findings of serious setbacks in California's huge projected industrial expansion, as well as in currently operating industries, due to material shortages as well as to CPA curtailment of permits for industrial construction. Because of these deterrent factors many national concerns planning to build plants in California, or to enlarge existing facilities here, are being forced to postpone expansion plans.

Columbia Basin Project Contracts Are Authorized

SEATTLE

Expansion of the Bureau of Reclamation's million-acre Columbia Basin project in eastern Washington state is assured by President Truman's action in relaxing restrictions on the agency's expenditures. Secretary of the Interior J. A. Krug has already authorized con-

tract awards totaling $15,106,739.

While in Seattle last week, Lt. Gen. Raymond A. Wheeler, chief of engineers, U. S. Army, announced an allotment of funds to initiate advance planning and preparation of the definite project report on the proposed $104 million Foster Creek dam on the upper Columbia river.

The Alaska Railroad has begun an expansion and rehabilitation program involving 70 per cent replacement of present equipment and increased tonnage capacity, according to Col. J. P. Johnson, general manager. About 500 pieces of rolling stock and equipment, obtained from the War Assets Administration have been assembled at the Auburn storage center for shipment to Alaska. This includes two diesel-electric locomotives purchased at $38,380 each, and five railroad hospital cars purchased at $56,214 apiece. Gondolas, two 65-ton diesel engines and other equipment are awaiting shipment, the total exceeding 10 shiploads.

Rock Drill Firm Operating At Capacity; Demand Large

Hughes Tool Co., Houston, Tex., manufacturer of rock drill bits has announced that it is currently operating at capacity and is extending its efforts to meet the active demand for its products.

Increasing explorations for petroleum reserves since the end of the war have intensified the demand for rock drill bits not only in this country but throughout the world. The Hughes company's books list orders from several foreign nations including Rumania, Russia, and a number of South American countries.

Operating a plant which covers 75 acres and employs 5200, the company produces bits tailor-made to meet varying formations encountered beneath the earth's surface. Illustrative of the problems which must be overcome in the manufacture of a drill bit is the need not only to produce a bit which is highly resistant to wear but which can stand up under the terrific pressure and intense heat of 350 degrees C. sometimes found at the bottom of a 12,000 ft hole.

Zinc-Lead Ore Reserves Valued at $171 Million

Zinc-lead ore reserves of the Tri-State district of Kansas, Oklahoma and Missouri are estimated at nearly 51 million tons of minable ore, valued at about $171 million based on current prices, according to the Bureau of Mines. Although only 6,569,000 tons of new reserves were added in the district in 1944 and 1945, 16,587,000 tons were mined, the report shows.

Industrial Buyers Showing More Price Resistance at Los Angeles

Scaling down of purchases anticipated in area. Some recession in business activity seen by Chamber of Commerce. Shortage of supplies and strikes figuring adversely in industrial outlook survey

LOS ANGELES

IN A round-up of the industrial outlook for the immediate future in southern California, the Industrial Department, Los Angeles Chamber of Commerce, last week predicted a period of lowered business activity.

Without pessimism, the chamber report stated the backlog of unfilled orders appears to be increasing because of the shortages of basic materials and operating supplies. Another factor is the shortage of cars, which is serious, presaging curtailment of operations in still more industries.

A drop in consumers' demands is sure to result from the fact strikes in the area have cut into workers' pay checks.

There is a general opinion that industrial buyers soon will adopt a policy of scaling down purchases. For the second consecutive month there is a decrease in the number of reports from such buyers indicating lower prices. Meanwhile there is a slight drop in overall inventories. Slowness of deliveries is tending to reduce inventories in warehouses, or at least unbalance them.

For the first time since the war ended there is widespread resistance to higher prices in most raw commodities. Caution in buying is being more and more widely exercised.

Steel Demand Outstrips Capacity

One of the most serious material shortages threatening industrial development in southern California is mirrored in the fact that sheet steel production capacities on the West Coast are now leveled at 153,000 tons a year while demand has soared to 700,000 tons.

There are three ways of increasing the local supply of sheets, according to an analyst in the Chamber of Commerce, Los Angeles, last week. These are by developing western sheet production, by increases in CPA allocations (with actual deliveries), and by "stimulating" recognition by eastern producers of southern California needs.

Los Angeles area house furnace manufacturers were promised 789 tons of steel for delivery last October, 1794 tons for November and 2342 tons in December under allotments made by the CPA. Not a pound of steel on any of the orders has been delivered to manufacturers.

This was the basis last week of an appeal by Carleton B. Tibbetts, general manager, Los Angeles Steel Castings Co., and Chamber of Commerce materials executive, to Wilson W. Wyatt, housing expediter. Mr. Tibbetts asked Mr. Wyatt to find out why southern California producers of water heaters and furnaces, so badly needed in homes, cannot get steel.

"No steel has been received in Los Angeles on CPA allocations for these industries during the fourth quarter of 1946," Mr. Tibbetts said. "Production schedules are bogging down. This is sure to be reflected in the national housing program."

When Mr. Wyatt visited Los Angeles a few weeks ago he was informed completion of the gas-fired, warm-air furnace component of his housing program was dependent upon a more equitable allocation of steel to southern California, Mr. Tibbetts declared.

Area Is Large Producer

"Manufacturers in the area produce 65 per cent of the national total of this needed type of heating unit," he added. "Plant owners were informed steel allocations would be doubled in the fourth quarter. Apparently, local industry is being kidded by the simple process of doubling quantities of materials not being received at all."

Sale to Douglas Aircraft Co. of 1,200,000 square feet of the Long Beach plant operated by Douglas during the war, for approximately $7,500,000 was announced last week by the WAA office in Los Angeles.

The aircraft company will build prefabricated houses as well as planes in the factory, which is windowless and air-conditioned. It was built by the government at an original cost of $11,500,000.

Another 540,000 square feet at the location is occupied by the Kaiser-Frazer Motor Co.

Purchase by Douglas of another group of buildings at its site in Santa Monica was announced by WAA recently. Sale price in that deal was reported as being $3,667,104.

Men of Industry

MARSHALL M. SMITH

W. C. KEGG

O. P. MOON

Marshall M. Smith has been elected president, E. W. Bliss Co., Detroit. He will assume his new duties after Dec. 1, at which time **D. S. Harder,** present Bliss president, will take office as vice president in charge of operations of Ford Motor Co., Dearborn, Mich. In June, 1946, Mr. Smith was elected vice president and director of the Bliss company. He will continue to serve as chairman of the board of directors of both E. W. Bliss (England) Ltd., and E. W. Bliss Co. (Paris), and as director of E. W. Bliss Co. of Canada Ltd. He joined the Bliss company in March, 1945, having previously been manager of export sales and foreign operations for Worthington Pump & Machinery Corp., East Harrison, N. J.

—o—

F. D. Smith and **M. F. Hazel** have been named assistant general managers of sales, Oil Well Supply Co., Dallas, Tex., subsidiary of United States Steel Corp., New York. The following men have been named sales department managers: **V. J. Waters,** drilling equipment; **J. S. Fuller,** production equipment; **C. A. Bell,** used equipment; and **M. D. Routzon,** merchandise claims.

—o—

Monsanto Chemical Co., St. Louis, has announced the following territorial assignments for salesmen in its newly organized textile chemicals department: **W. R. Battersby,** Maine, New Hampshire, northeastern Massachusetts; **T. E. Lannefield,** Rhode Island, southeastern Massachusetts and eastern Connecticut; **E. S. Lamont,** New York, excepting New York City, Vermont, western Massachusetts and western Connecticut; **C. F. Bishop,** New York City, upper Pennsylvania and upper New Jersey; **E. H. McCoy,** Delaware, Maryland, lower Pennsylvania and lower New Jersey; **F. K. Burre,** Virginia, West Virginia, North and South Carolina; **R. Gow III,** Middle West; and **R. N. Foster,** southern states. Mr. Battersby and Mr. McCoy served in the Navy. Mr. Lamont, Mr. Gow and Mr. Bishop served in the Army.

—o—

W. C. Kegg has been appointed personnel director, Progressive Welder Co., Detroit. His responsibilities include both employment and industrial relations, as well as supervision of company sponsored employee activities. During the war, Mr. Kegg was assistant to the president, Hosdreg Chemical Corp., Huntington, Ind. In 1939 and 1940, he was assistant personnel manager, Osborn Mfg. Co. Inc., Cleveland.

—o—

James W. Kettle has been appointed works auditor, Gary, Ind., sheet and tin mill, Carnegie-Illinois Steel Corp., Pittsburgh, succeeding **Charles D. Henderson,** who retired Nov. 1, after 40 years' service with U. S. Steel subsidiaries. Since June, 1945, Mr. Kettle had been assistant supervisor of the Statistics Division of Carnegie-Illinois in Pittsburgh, and previously was Chicago district supervisor of the analytical cost bureau.

—o—

Howard J. Poland has been named district manager for the newly opened Memphis, Tenn., office, Granite City Steel Co., Granite City, Ill. The Memphis territory includes Arkansas, Tennessee, Louisiana and Mississippi.

—o—

Walter S. Praeg has been elected president, National Broach & Machine Co., Detroit, succeeding the late **Robert S. Drummond,** founder of the firm. **J. Irvin Schultz** has been elected vice president and treasurer. Mr. Praeg, former vice president, has been a member of the organization since its beginning. Mr. Schultz, formerly treasurer, joined the firm in 1933.

—o—

O. P. Moon has been appointed general attorney and secretary, American Steel & Wire Co., Cleveland, subsidiary of United States Steel Corp. For the last 3 years, Mr. Moon was with the law department of Carnegie-Illinois Steel Corp., Pittsburgh, another subsidiary of United States Steel Corp. Prior to that, he was engaged in the private practice of law in Cleveland and Lorain, O.

—o—

H. M. Dawson has been appointed director, Jessop Steel International Corp., wholly owned subsidiary of Jessop Steel Co., Washington, Pa. His headquarters are in New York. Jessop Steel International Corp. was known formerly as Jessop Export Sales Corp.

—o—

Thomas T. Dickson has been appointed manager, Specialty & Machinery Division, general sales department, United States Steel Supply Co., Chicago, subsidiary of United States Steel Corp. Mr. Dickson has been with the Supply company since 1916.

—o—

Harold E. Jalass has been appointed general sales manager, Cribben & Sexton Co., Chicago, succeeding **John E. Bogan.** Mr. Jalass joined the company in 1917, and was added to its sales staff in 1922. For the last 15 years, he was district manager of the metropolitan Chicago area. In August he was appointed assistant general sales manager.

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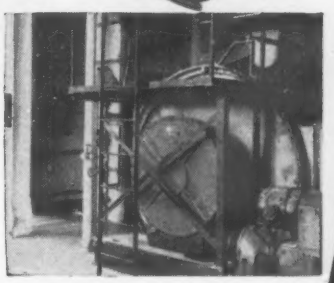
Torrington Co., Torrington, Conn., announces the following district engineer appointments in connection with the company's anti-friction bearing activi-

MONEL BOLTS ARE BEST ...AGAINST SALT CORROSION



A filter used in Morton Salt Company brine evaporating process. Nickel Alloy drums use Monel Metal bolts and rivets. Many Brass and Bronze fastenings are also used to prevent corrosion.

OF the destructively corrosive effect of salt and salt brine upon common steel probably no one knows more than the Morton Salt Company . . . "when it rains it pours."

To reduce maintenance costs in their salt mining and evaporating processes the Morton Company relies upon Monel Metal in contacts with salt and salt brine, using Harper fastenings of the same non-corrosive, non-rusting alloy.

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ties: Chicago district manager, **Frank H. Marchand**; Chicago district engineers, **Ray G. O'Connell** and **C. R. Recor**; Torrington district engineer, **Buell D. Dean**; Cincinnati district engineer, **Fred J. Norman**; and Los Angeles district engineering, **Frank P. Tipton.**

—o—

Thomas J. Watson Jr., vice president, International Business Machines Corp., New York, has been elected a director of the company, succeeding the late **Hon. Abraham L. Kellogg.** Mr. Watson joined IBM in 1937, served 4 years in the Sales Division, and then entered the Army Air Force. Upon his return, he was appointed assistant to the executive vice president. He was elected a vice president of the company last June.

—o—

W. Harry Bailey has been appointed manager of coke and by-products sales, Alabama By-Products Corp., Birmingham. For the last few years, he had been assistant manager of coke and by-products sales for the firm.

—o—

Warren B. Whitney, general manager, National Cast Iron Pipe Division, James B. Clow & Sons, Birmingham, has been named vice president of the parent concern. He will continue in his present capacity at National in Birmingham.

—o—

T. Ames Wheeler has been appointed statistician, Allegheny Ludlum Steel Corp., Pittsburgh, succeeding **Harold G. Rogers.** Mr. Wheeler had been in the financial department of United States Steel Corp. for the last 4 years. He had once been with Chrysler Corp., Detroit.

—o—

Henry Chalfant, descendant of one of the founders of Spang-Chalfant & Co., now a division of National Supply Co., Pittsburgh, has been elected a director of the company. He fills the vacancy recently created by the retirement of **J. P. Shouvlin.** Mr. Chalfant is assistant secretary of National Supply. He served in the Army during the war.

—o—

Dr. J. B. Austin has been appointed director, Research Laboratory, Kearny, N. J., United States Steel Corp. of Delaware, succeeding **Dr. John Johnston**, retired. Dr. Austin was assistant director, and had been associated with Dr. Johnston at the laboratory since its inception in 1928. Dr. Johnston was made a member of the committee advisory to the Office of Production Management in 1940, called initially Technical Committee on Manganese, and later, Advisory Committee on Metals and Minerals. When the War Metallurgy Committee was established in 1942, he was appointed a member and served throughout the war. He also served on many special advisory committees and several project committees for the Office of Scientific Research and Development. Dr. Johnston also was active in the direction of work assigned to the U. S. Steel Research Laboratory by various branches of the government in developing improved war equipment.

—o—

Gordon C. Curry has been appointed assistant to the president at the plating plant of Precision Castings Co., Kalamazoo, Mich. He had been manager, Die Castings Division, Hoover Co., North Canton, O.

—o—

L. J. Renner has been appointed mid-continent wire rope sales manager, Wickwire Spencer Steel Division, Colorado Fuel & Iron Corp., Denver. He will have headquarters in Ft. Worth, Tex. Mr. Renner had previously handled the sale of wire rope for the division in the Chicago district office.

—o—

Acklin Stamping Co., Toledo, O., has re-elected the following officers: President, **F. Cyril Greenhill**; executive vice president and treasurer, **Alvin E. Seeman**; vice president in charge of manufacturing, **Harry F. Smith**; secretary, **George F. Medill**, and assistant treasurer and assistant secretary, **DeWitt L. Mielke.** The following members of the board of directors have been re-elected: **F. Cyril Greenhill, Alvin E. Seeman, George F. Medill,** and **Roy W. Kraft.** Harry F. Smith has been named a new member of the board. He joined the company in 1926, and has been vice president in charge of manufacturing operations since 1944.

—o—

John S. Csaklos has been appointed works manager, Hartford Electric Steel Corp., Hartford, Conn. He will be in charge of all the company's production and foundry operations. For the last 18 years, Mr. Csaklos served as foundry superintendent, Reading Steel Casting Division, Reading, Pa., American Chain & Cable Co. Inc. Prior to that, he was plant superintendent, Sterling Steel Casting Co., East St. Louis, Ill., for four years.

HARRY F. SMITH

—o—

O. W. Irwin has been appointed president, Rail Steel Bar Association, Chicago. He will take office Jan. 1. Mr. Irwin retired Oct. 31 as manager of concrete bar sales, Carnegie-Illinois Steel Corp., Pittsburgh, subsidiary of United States Steel Corp., New York. Mr. Irwin joined Carnegie-Illinois in 1935, having been previously vice president of the steel joist and reinforcing departments, Truscon Steel Co., Cleveland. He was an organizer and is a past president of both Concrete Reinforcing Steel Institute, and Steel Joist Institute.

—o—

George D. Melling Jr. has been appointed chief engineer, Snyder Tool & Engineering Co., Detroit, succeeding **William C. Oberem.** Mr. Oberem has resigned from the Snyder company to join the Buffalo Division, Farrel-Birmingham Co. Inc., in an engineering development position. He had been with Snyder for nearly 8 years. Mr. Melling joined the Snyder organization in 1935, and in recent years has concentrated his activities in sales engineering.

—o—

Wilson A. Wright has been appointed manager of sheet and strip sales, Republic Steel Corp., Cleveland, succeeding **John W. Carpenter** who resigned due to ill health. Mr. Wright joined Republic in 1930, in Youngstown, as a special representative in the Sheet & Strip Sales Division, and in 1933 was assigned to the Cincinnati district sales office. In 1937 he was made district representative in Louisville, remaining there until 1942 when he returned to Cincinnati as assistant district sales manager. In 1944, he came to Cleveland as assistant manager of the Sheet & Strip Sales Division.

—o—

Walter G. Patton, Detroit editor, *The Iron Age*, has been elected chairman for 1946-47, Detroit chapter, American Society for Metals. **E. H. Stilwell**, chief metallurgist, Dodge Division, Chrysler Corp., Detroit, has been elected secretary-treasurer of the chapter. **F. L. Woodside**, president, Park Chemical Co., Detroit, has been elected vice chairman.

—o—

Norman W. Stirling has joined the New York office organization of Elliott Co., Jeannette, Pa. Mr. Stirling had been manager of sales, Whitlock Mfg. Co., Hartford, Conn. Prior to that, he was

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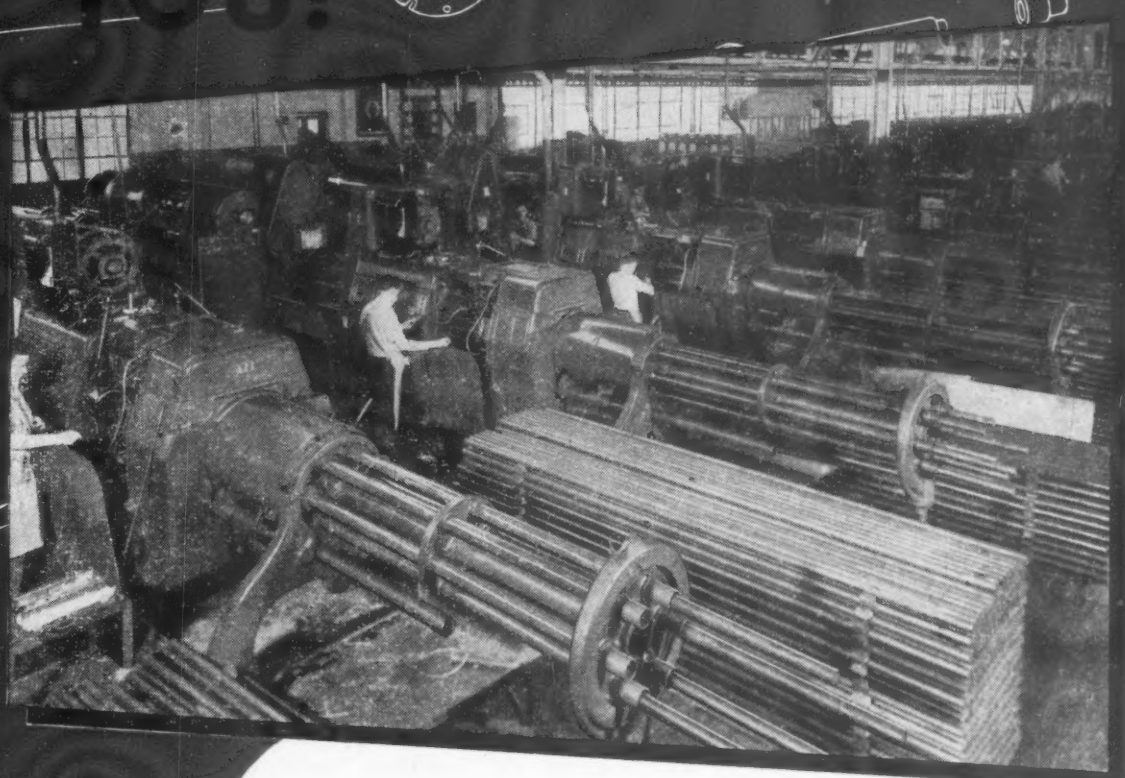

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EX-CELL-O *for* PRECISION

EDWARD GLEN BAER

Vice president, and recently appointed treasurer, Will-Burt Co., Orrville, O., noted in STEEL, Nov. 4 issue, p. 90.

E. B. ANDREWS

Appointed sales manager, O. K. Tool Co. Division, Aerodynamic Research Corp., Shelton, Conn., noted in STEEL, Nov. 4 issue, p. 86.

HOMER A. HOLT

Who has been appointed general counsel, Union Carbide & Carbon Corp., New York, noted in STEEL, Nov. 4 issue, p. 88.

in charge of sales of heat transfer and petroleum equipment for M. W. Kellogg Co., New York. Mr. Stirling was president of Heat Exchange Institute for a 1 year term, and president for 3 years of Tubular Exchanger Manufacturers Association.

—o—

George P. Torrence has been named president, Link-Belt Co., Chicago, succeeding **William C. Carter** who has retired. Mr. Torrence had been executive vice president of the company since July 1. He originally joined Link-Belt in 1911, as a draftsman in Indianapolis, and has had 25 years' experience with the firm. He was manager of the Indianapolis operations from 1926 to 1932, and president from 1932 to 1936. From 1936 to 1944 Mr. Torrence was general manager, Rayon Machinery Co., a subsidiary of Industrial Rayon Corp., Cleveland. He was president, Cleveland Pneumatic Tool Co., Cleveland, from 1944 to 1946. Mr. Carter, who had been president of Link-Belt since Dec., 1942, continues as a director of the company and as chairman of the executive committee of the board. He will also serve the firm as a consultant.

—o—

B. A. Dollens, general manager, Saginaw Malleable Iron Division, Saginaw, Mich., General Motors Corp., Detroit, has been appointed assistant general manager of the corporation's Electro-Motive Division, La Grange, Ill. **James H. Smith,** assistant to **F. L. Burke,** vice president in charge of the Accessory Divisions Group of GM, has been appointed general manager of the expanded Central Foundry Division, with headquarters in Saginaw. **S. W. Healy,** in charge of the old Central Foundry Division, has been appointed assistant to Mr. Smith.

—o—

Frank Hubert Jr. has been appointed traffic manager, Bethlehem Pacific Coast Steel Corp., San Francisco, succeeding **George J. Sussman,** retired. Mr. Hubert was attached to the traffic department at Bethlehem's Houston, Tex., office, and at the Los Angeles office of the company. **E. N. Ferretta** has been named assistant traffic manager of the firm, and will be located in the general offices in San Francisco. He has been with the company since 1943.

—o—

A. R. Sittig has been appointed manager of manganese steel sales, American Manganese Steel Division, Chicago Heights, Ill., American Brake Shoe Co. **E. L. Quinn** has been appointed assistant vice president in charge of welding products. **E. J. Nist** has been named assistant vice president with offices in New York. All three men have been with American Manganese Steel many years.

—o—

Daniel P. Murphy, vice president in charge of operations of Symington-Gould Corp. plants in Depew and Rochester, N. Y., has been elected a director of the corporation.

OBITUARIES . . . .

William Paulus, 57, vice president and factory manager, Trico Products Corp., Buffalo, died in that city, Oct. 29.

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Leroy M. Wheeler, 64, founder and manager, Wheeler Equipment Co., Buffalo, died Oct. 29.

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Roswell D. Grant, 57, vice president, Pyle-National Co., Chicago, died in that city recently. He had been with the company 33 years.

—o—

William A. Maxwell, 67, former president, Colorado Fuel & Iron Corp., Denver, died in Pueblo, Colo., Oct. 30, from a gunshot wound suffered in a hunting accident. Mr. Maxwell retired as president of the firm a year ago.

—o—

Clarence A. Newport, 80, general clerk, handsaw department, E. C. Atkins & Co., Indianapolis, died recently. He joined the company in 1886.

—o—

R. B. Nixon, retired salesman, E. C. Atkins & Co., Indianapolis, died recently. He joined the company in 1907.

—o—

Harry M. Hall, 63, vice president, Consolidation Coal Co., Chicago, died Oct. 25 while on a hunting trip in Pukwana, S. D.

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Gordon Buchanan Sr., 83, vice president, Old Ben Coal Corp., Chicago, died in Highland Park, Ill., Oct. 26. He was president of Wilmington Star Mining Co.

—o—

William W. Bond, 52, divisional sales manager in Indianapolis, Link-Belt Co., Chicago, died recently. He joined the company in 1911, and had been with the sales department since 1920.

—o—

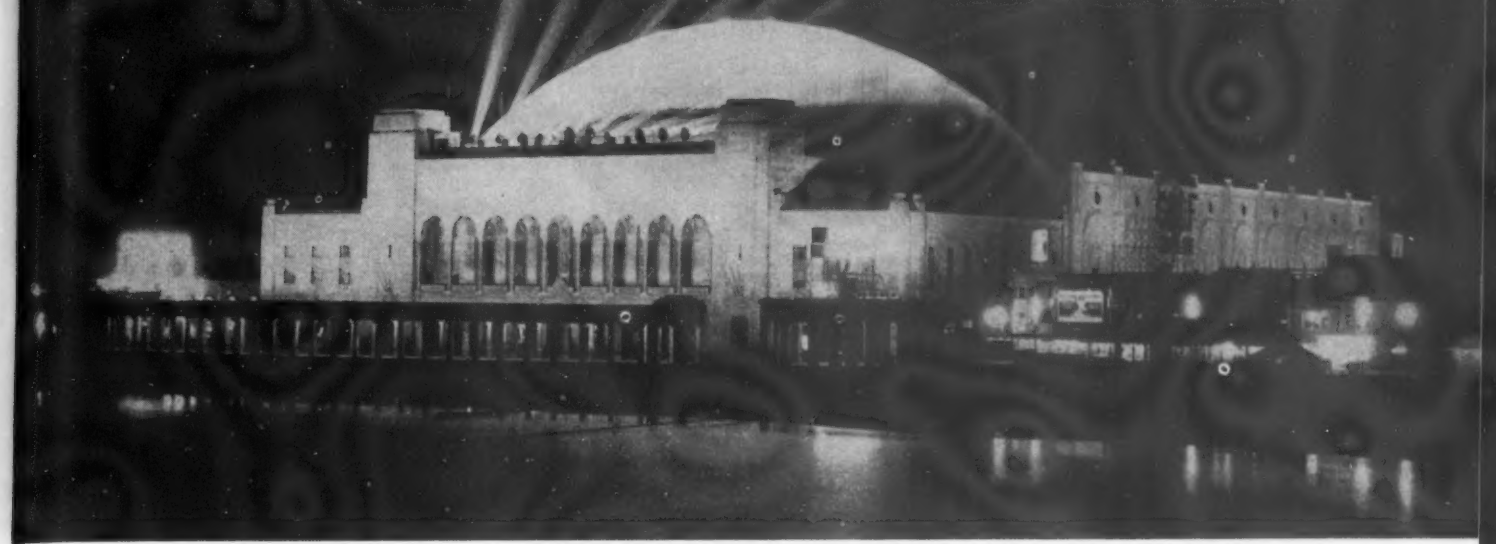
Arthur D. Baker, 92, former secretary and treasurer, South Bend Chilled Plow Co., South Bend, Ind., died recently.

—o—

Arthur P. Stephenson, 69, for years Indianapolis plant treasurer, National Malleable & Steel Castings Co., Cleveland, died recently at his home in Indianapolis.

Twenty Eighth

NATIONAL METAL CONGRESS



Four major technical societies are participating in the National Metal Congress which convenes in Atlantic City Nov. 18. Seventy-nine simultaneous sessions scheduled. About 400 manufacturers will use Metals Exposition to display products and methods covering nearly every phase of metalworking

THIS year, for the first time since 1944, other major technical societies are co-operating with the American Society for Metals in its twenty-eighth annual National Metal Congress at Atlantic City, N. J., during the week beginning Nov. 18. In addition to ASM, participants are the American Welding Society, Iron and Steel Institute of Metals Divisions of American Institute of Mining and Metallurgical Engineers, and the American Industrial Radium and X-Ray Society, Inc.

There is a seriousness of purpose about this meeting, a feeling of unspoken determination to get the most out of its 79 technical sessions and Metals Exposition, even more marked than in former years. Caught in a whiptide of mounting costs and material scarcities, most metalworking companies are steering the only course open to them — substitution or wholly new specifications, plus refinement of process and manufacturing equipment.

The simultaneous sessions of four engineering societies will reveal once again the timely achievements of the men who have discovered and properly appraised new properties in known metals, employed heat treatment with singular effect, developed new tests as a guide to performance, worked up new combinations of alloys, and altered chemistry of metals for refinement of structure.

Twenty-two educational lectures and 64 technical papers will be presented in the five-day sessions of American Society for Metals. This is the largest number of papers ever scheduled by ASM for an annual convention. Three simultaneous sessions will be held each morning, except Wednesday, beginning at 10:00 a. m. Starting at 2:00 p.m., two sessions will be held each afternoon. The educational lectures scheduled for 8:00 p. m., will include the following subjects: "The Structure of Cast Iron", "Physical Metallurgy of Aluminum", "Sleeve Bearing Metals" and "Electronic Methods of Inspection of Metals." These lectures are a new feature with interesting subject-matter and fill a space in the program left by omission of panel discussions, previously a part of the regular schedule.

On Monday morning three papers on high-temperature alloys, a new and much discussed subject, will be presented. Magnesium will be discussed in three papers to be heard in another simultaneous session, while a third session covers research on stainless steel.

During the remainder of the week, ASM technical sessions will include papers on steelmaking, hardening, tempering, and subzero temperature treatments, austenite transformation, crystal structure, failures and inspection methods, copper alloys, carburizing phenomena, cast steels, hydrogen embrittlement and other individual papers on many other subjects kindred to the metals field.

The annual meeting of the society on Wednesday morning, at which unopposed nominees for officers and trustees will be elected, will be followed by the Edward de Mille Campbell Memorial Lecture by J. B. Austin, vice president, United States Steel Corp. His subject will be "The Effect of Changes in Condition of Carbides on Some Properties of Steel." Walter S. Tower, president, American Iron and Steel Institute, will speak at the ASM annual banquet at the Traymore hotel Thursday evening. On the same occasion the Albert Sauveur Achievement Award will be made to Dr. E. C. Bain, vice president, Carnegie-Illinois Steel Corp.; Dr. R. E. Zimmerman, vice president, United States Steel Corp., will receive the ASM Medal for Advancement of Research; and the Henry Marion Howe Medal will be presented to Dr. C. R. Austin, Meehanite Metal Corp., and to Dr. M. C. Fetzer, Carpenter Steel Co.

In the course of its well filled five-day program, which "cross-sections" and holds up for study many of the latest developments in electrodes, machines and methods, the American Welding Society will present its medals and prizes for signal accomplishments in the advancement of the art. Awards will be made Thursday evening at the annual dinner in the Ambassador hotel, headquarters of the society and site of all meetings. On Monday evening Dr. W. F. Hess of Rensselaer Polytechnic Institute will de-

W. F. HESS
Rensselaer Polytechnic Institute, Adams Lecturer, AWS

WILLIAM HUME-ROTHERY
Physicist, Oxford University, Oxford, England, and featured speaker for AIME

E. C. BAIN
Vice President, Carnegie-Illinois Steel Corp., and winner, Albert Sauveur Achievement Award, ASM

liver the Adams Lecture, an event customarily the high point of American Welding Society proceedings.

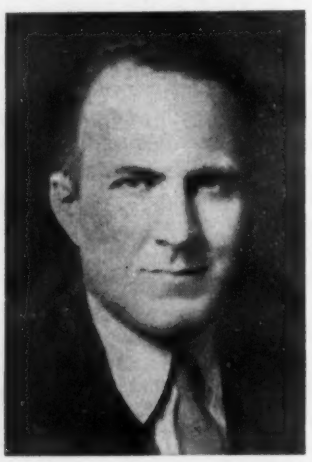
The first of 24 technical sessions arranged for the meeting will be held on Monday morning. Three simultaneous sessions are scheduled for each morning and afternoon, Monday through Wednesday and for Thursday and Friday mornings. An unusually heavy program of 80 technical papers will be presented by the country's leading welding specialists.

William Hume-Rothery, physicist, Oxford University, Oxford, England, will address the Institute of Metals Division of the American Institute of Mining and Metallurgical Engineers on Tuesday morning at Hotel Claridge, headquarters of AIME's three-day sessions ending Wednesday afternoon. His subject will be "Electrons, Atoms, Metals and Alloys." Dr. Rothery has been on a lecture tour of technical schools in this country since mid-October.

Dr. Kent R. Van Horn, president, American Industrial Radium and X-Ray Society Inc., will make his retiring address before the society on Thursday morning at the Seaside hotel, scene of that society's activities from Wednesday through Friday afternoon. He will receive the Mehl Lecture Award at that time.

Registration and all ASM technical sessions will take place at the Municipal Auditorium, scene of the National Metal Exposition. Over 375 manufacturers will use the exposition to display products and methods covering nearly every phase of metalworking. The show, which is expected to attract about 15,000 persons, will present products or displays of at least 57 producers of primary metals—including iron and steel, aluminum, magnesium, copper and other nonferrous metals — manufacturers of tool steels, stainless and high temperature alloys, alloy steels, bars, rods, tubing, sheet and shapes, and castings and forgings. About 45 furnace builders will exhibit newer melting, heat treating and forging furnaces, while induction heating equipment will appear in considerable amounts, some of it in operation.

All types of welding on all types of metals will be included in the exhibits of 50 or more firms in this field. An innovation in arrangement is the grouping together of 16 company members of the Resistance Welder Manufacturers' Association whereby their equipment will appear side-by-side. Forty-three instrument makers and 36 manufacturers of metal cleaning and finishing supplies and equipment will be represented along with gage makers, testing machine and machine tool manufacturers, suppliers of cutting and lubricating oils, laboratory equipment, etc., occupying in all nearly 4 acres of floor space. Complete list of exhibitors may be seen on p. 145. Hours of Exposition are 12 noon to 10:30 p.m. on Monday, Tuesday and Wednesday, and 10:00 a.m. to 6:00 p.m. on Thursday and Friday.



KENT R. VAN HORN
Retiring *President*, American Industrial Radium and X-Ray Society and recipient, Mehl Lecture Award

Committee for 1947 Western Congress Named

Eleven prominent manufacturers and engineers from the Pacific coast were recently named to the general committee of the fifth Western Metal Congress and Exposition. The event is to be held in the San Francisco-Oakland area for six days beginning March 22, 1947.

E. S. Hudson, manager, Western Forge & Tool Works, Oakland, will head the group, according to W. H. Eisenman, managing director of the Western congress and secretary of the American Society for Metals, sponsors of the joint meetings.

Associated with Mr. Hudson as vice chairmen are C. D. Amico, steel specialist, Joseph T. Ryerson & Son Co., Los Angeles, and F. B. Drake, president, Johnson Gear & Mfg. Co. Ltd., Berkeley, Calif. Harold E. Krayenbuhl, engineer, Oliver United Filters Inc., Oakland, is secretary.

According to Mr. Eisenman, the Western Metal Congress and Exposition will have the active co-operation of West Coast chapters of the nation's leading technical societies. Dr. J. E. Dorn, chairman, program committee and trustee-elect of the American Society for Metals, reports excellent progress.

Technical meetings of the congress and industrial exhibits of the exposition will be held in the two adjoining Oakland civic auditoriums.

Plans are underway for lecture courses, technical papers and roundtable conferences of interest to the metals, aircraft, chemical, petroleum, mining and general manufacturing industries.

PROGRAM . . .

AMERICAN SOCIETY FOR METALS

Monday, Nov. 18—10:00 A.M.

Session No. 1

"The Development of a Turbosupercharger Bucket Alloy", by E. Epremian, Rensselaer Polytechnic Institute.

"The Stress Rupture and Creep Properties of Heat Resistant Gas Turbine Alloys", by Nicholas J. Grant, Massachusetts Institute of Technology.

"Structural Variations in Gas Turbine Alloys Revealed by the Stress-Rupture Test", by Nicholas J. Grant, Massachusetts Institute of Technology.

Session No. 2

"Some Special Metallographic Techniques for Magnesium Alloys", by P. F. George, Dow Chemical Co.

"Calculation of Press Forging Pressures and Application to Magnesium Forgings", by R. L. Dietrich and G. Ansel, Dow Chemical Co.

"Plastic Deformational Analyses on Pure Magnesium", by Louis A. Carapella and William E. Shaw, Mellon Institute of Industrial Research.

Session No. 3

"Stability of Austenite in Stainless Steels", by C. B. Post and W. S. Eberly, Carpenter Steel Co.

"The Cold Work Hardening Properties of Stainless Steel in Compression", by F. K. Bloom, G. N. Goller and P. G. Mabus, Rustless Iron & Steel Div., American Rolling Mill Co.

"Quantitative Evaluation of Intergranular Corrosion of 18-8 Ti", by Freeman J. Phillips, Carnegie-Illinois Steel Corp.

Monday, Nov. 18—2:00 P.M.

Session No. 1

"Ladle Deoxidation of Killed Steel With Silicon Carbide and Its Effect on Physical Properties and Hardenability", by E. A. Loria and A. P. Thompson, Mellon Institute of Industrial Research.

"The Physical Chemistry of Acid Refining Process", by Yap Chu-Phay, National Resources Commission of China.

"The Chromium-Oxygen Equilibrium in Liquid Iron", by Hsin-Min Chen, Carnegie-Illinois Steel Corp., and John Chipman, Massachusetts Institute of Technology.

Session No. 2

"The Precipitation Heat Treatment of Work Hardened 61 S-W Aluminum Alloy", by J. J. Warga, Kaiser Fleetwings.

"Constitution of the System Indium-Tin", by F. N. Rhines, W. M. Urquhart and H. R. Hoge, Carnegie Institute of Technology.

"New Wrought Zinc Alloys Containing Small Amounts of Beryllium", by R. H. Harrington, General Electric Co.

ASM EVENTS

All technical programs and educational lectures of ASM are being held in Convention Hall. The Traymore hotel is headquarters for the society and will be the scene of the American Society for Metals annual banquet on Thursday evening, Nov. 21.

Tuesday, Nov. 19—10:00 A.M.

Session No. 1

"Bainitic Hardening of High Speed Steel", by C. K. Baer and P. Payson, Crucible Steel Co. of America.

"The Tempering of High-Alloy Toolsteels", by G. A. Roberts, A. H. Grobe and C. F. Moersch, Jr., Vanadium-Alloys Steel Co.

"Changes in Size and Toughness of High-Carbon High-Chromium Steels Due to Subzero Treatments", by L. E. Gippert and G. M. Butler, Jr., Allegheny Ludlum Steel Corp.

Session No. 2

"Pole Figures of the Effect of Some Cold Rolling Mill Variables on Low-Carbon Steel", by John Karl Wood, Jr., Pennsylvania State College.

"X-Ray Study of the Effect of High Hydrostatic Pressures on the Perfection of Crystals", by Louis Rosen, Santa Fe, N. M.

"A Periodic Chart for Metallurgists", by Carl A. Zapffe, Baltimore.

Session No. 3

"Formation and Transformation Studies of Iron-Carbon Powder Alloys", by John F. Kahles, University of Cincinnati.

"Carbon Concentration Control", by E.

WALTER S. TOWER
President, American Iron and Steel Institute and featured speaker for ASM annual banquet

R. E. ZIMMERMAN
Vice President, United States Steel Corp., and recipient of ASM Medal for Advancement of Research

M. C. FETZER
Carpenter Steel Co., Medalist, Henry Marion Howe Award, ASM

C. R. AUSTIN
Meehanite Metal Corp. Medalist, Henry Marion Howe Award, ASM

G. de Coriolis, O. E. Cullen and Jack Huebler, Surface Combustion Corp.

"Decarburization During Annealing of Malleable Iron", by H. A. Schwartz and James Hedberg, National Malleable & Steel Castings Co.

Tuesday, Nov. 19—2:00 P.M.

Session No. 1

"Precipitation in a Magnesium Sheet", by C. T. Haller, International Nickel Co., and C. S. Barrett, Institute for the Study of Metals, University of Chicago.

"Folding in the Cupping Operation", by W. M. Baldwin, Jr., and T. S. Howald, Chase Brass & Copper Co.

"Bearing Properties of 24 S-T Sheet and Shear Strength of 24 S-T Rivets at Elevated Temperatures", by A. E. Flanigan, L. F. Tedson and J. E. Dorn, University of California.

Session No. 2

"Development of Temper Brittleness in Alloy Steels", by W. S. Pellini, American Brake Shoe Co., and B. R. Queneau, Carnegie-Illinois Steel Corp.

"A Metallographic Etchant to Reveal Temper Brittleness in Steel", by J. B. Cohen, A. Hurlich and M. Jacobson, Watertown Arsenal.

"Electrolytic Conductivity as a Method for Studying Electronic Transitions in Elements—Application to Iron, Nickel and Cobalt", by W. R. Ham and C. H. Samans, American Optical Co.

Wednesday, Nov. 20—10:00 A.M.

ASM Annual Meeting

Edward de Mille Campbell Memorial Lecture, by J. B. Austin, United States Steel Corp.

Wednesday, Nov. 20—2:00 P.M.

Session No. 1

"Changes in Austenitic Chromium-Nickel Steels During Exposures at 1100 to 1700° F.", by Peter Payson and C. H. Savage, Crucible Steel Co. of America.

"Cast Heat Resistant Alloys of the 16% Chromium, 35% Nickel Type", by Howard S. Avery and Norman A. Matthews, American Brake Shoe Co.

"The Apparent Influence of Grain Size on the High-Temperature Properties of Austenitic Steels", by C. L. Clark, Timken Roller Bearing Co., and J. W. Freeman, University of Michigan.

Session No. 2

"A Study of Furnace Brazing as Applied to 12% Chromium Low-Carbon Steel", by T. H. Gray, Westinghouse Electric Corp.

"Stress Cracking of Electroplated Lockwashers", by K. B. Valentine, Pontiac Motor Div., General Motors Corp.

"Nondestructive Inspection of Mine Hoist Cable", by P. E. Cavanagh, Allen B. Du Mont Laboratories, Inc., and R. S. Segsworth, General Engineering Co., Ltd.

Thursday, Nov. 21—10:00 A.M.

Session No. 1

"The Interrupted Quench and Its Practical Aspects", by Howard E. Boyer, American Bosch Corp.

"Experimental Studies of Continuous Cooling Transformations", by C. A. Liedholm, Curtiss-Wright Corp.

"Isothermal Transformation of Austenite", by Axel Hultgren, K. Tekniska Hogskolan, Sweden.

Session No. 2

"Influence of the Strain Rate and the Stress System on the Mechanical Properties of Copper", by D. J. McAdam, Jr., G. W. Geil and D. H. Woodard, National Bureau of Standards.

"Copper-Manganese Alloys—the Properties of Cold Worked and Annealed Alloys Containing 2 to 20% Manganese", by R. S. Dean, J. R. Long, T. R. Graham and D. P. Sugden, U. S. Bureau of Mines.

"Age Hardening Copper-Cobalt-Manganese Alloys", by Jay W. Fredrickson, University of Utah.

Session No. 3

"Ingot Factors in the Production of Seamless Gun Tubes", by J. W. Spretnak, Carnegie Institute of Technology, K. L. Fetters, Youngstown Sheet & Tube Co., and E. L. Layland, Westinghouse Electric Corp.

"Kinetics of Solidification of Killed Steel Ingots", by J. W. Spretnak, Carnegie Institute of Technology.

"Theoretical Thermal Studies of Steel Ingot Solidification", by Victor Paschkis, Columbia University.

Thursday, Nov. 21—2:00 P.M.

Session No. 1

"The Measured Knoop Hardness of Hard Substances and Factors Affecting Its Determination", by Newman W. Thibault and Helen L. Nyquist, Norton Co.

"Determination of Knoop Hardness Numbers Independent of Load", by L. P. Tarasov and N. W. Thibault, Norton Co.

"Hardenability of Shallow Hardening Steels Determined by the PV Test", by B. F. Shepherd, Ingersoll-Rand Co.

Session No. 2

"The Effect of Composition on the Fatigue Strength of Decarburized Steel", by L. R. Jackson and T. E. Pochapsky, Battelle Memorial Institute.

"Hardness Testing of Metals and Alloys at Elevated Temperatures", by Frederick P. Bens, Climax Molybdenum Co. of Michigan.

"Mechanical Properties of Cast Low-Alloy Steels", by Malcolm F. Hawkes, Carnegie Institute of Technology.

Friday, Nov. 22—10:00 A.M.

Session No. 1

"Carburized Cases of Hypo-Eutectoid Carbon Content", by P. C. Rosenthal and G. K. Manning, Battelle Memorial Institute.

"Carbide and Oxide in Surface Zones of Carburized Alloy Steels", by Axel Hultgren and Erik Hagglund, K. Tekniska Hogskolan, Sweden.

"Transformations in Krupp-Type Carburizing Steels", by A. R. Troiano and J. E. DeMoss, University of Notre Dame.

Session No. 2

"The Effects of Microstructure on the Mechanical Properties of Steel", by J. H. Hollomon, L. D. Jaffe, D. E. McCarthy and M. R. Norton, Watertown Arsenal.

"Metallurgical and Structural Investigation of Steel Castings for Aircraft", by L. W. Smith and L. D. Morris, Cornell Aeronautical Laboratory.

"Factors Influencing the Pearlitic Microstructure of Annealed Hypo-Eutectoid Steel", by R. A. Grange, United States Steel Corp.

Session No. 3

"The Effect of Manganese on the Properties of Cast Carbon and Carbon-Molybdenum Steels", by N. A. Ziegler, W. L. Meinhart and J. R. Goldsmith, Crane Co.

"Relation of Quenching Rate and Hardenability to the Mechanical Properties of Several Heat Treated Cast Alloy Steels", by Charles R. Wilks, Howard S. Avery and Earnshaw Cook, American Brake Shoe Co.

"A Laboratory Study of Quench Cracking in Cast Alloy Steels", by M. C. Udy and M. K. Barnett, Battelle Memorial Institute.

Friday, Nov. 22—2:00 P.M.

"Practical Importance of Hydrogen in Metal-Arc Welding of Steel", by S. A. Herres, Battelle Memorial Institute.

"Effect of Composition, Heat Treatment, and Cold Work on the Hydrogen Embrittlement of Stainless Steel Wire During Cathodic Pickling", by Carl A. Zapffe, Baltimore, Md., and O. George Specht, Jr., Grede Foundries.

"Acid Composition, Concentration, Temperature and Pickling Time as Factors in the Hydrogen Embrittlement of Mild Steel and Stainless Steel Wire", by Carl A. Zapffe and M. Eleanor Haslem, Baltimore.

"Measurement of Embrittlement During Chromium and Cadmium Electroplating and the Nature of Recovery of Plated Articles", by Carl A. Zapffe and M. Eleanor Haslem, Baltimore.

ASM...EDUCATIONAL LECTURES...ASM

SLEEVE BEARING METALS

Sixteen Lectures—Five Sessions

Mon., Tues. and Wed., Nov. 18, 19 and 20—2:00 P.M. and 8:00 P.M.

"Fundamental Considerations Concerning the Behavior of Bearings", by R. W. Dayton, Battelle, Memorial Institute.

"Some General Comments on Bearings", by Carl E. Swartz, John Hopkins University.

"Cast Bronze Bushings", by Leighton M. Long, Toledo, O.

"Porous Metal Bushings", by A. J. Langhammer, Chrysler Corp., Amplex Div.

"Newer Bearing Materials", by I. C. Sleight, Menasco Mfg. Co. and Wayne Sink, P. R. Mallory & Co.

"Electroplated Bearings", by Ralph A. Schaefer, Cleveland Graphite Bronze Co.

"Aluminum Alloy Bearings", by H. Y. Hunsicker, Aluminum Co. of America.

"Mechanical Features of Steel-Backed Bearings", by E. Crankshaw, Cleveland Graphite Bronze Co.

"Moraine Durex-100 Engine Bearings", by J. A. Lignian, Moraine Products Div., General Motors Corp.

"Bronze-Backed Bearings", by Bernard J. Esarey, National Bearing Div., American Brake Shoe Co.

"Preparing Cast Iron Surfaces for Bonding", by J. H. Shoemaker, Kolene Corp.

"Selection of Bearing Materials", by Arthur F. Underwood, General Motors Research Laboratories.

"Selection of Bearing Materials in the Electrical Industry", by D. F. Wilcock, Thomson Laboratory, General Electric Co.

"Railroad Journal Bearings", by E. S. Pearce, Railway Service & Supply Corp.

"Aircraft Engine Bearings", by J. Palsulich, Wright Aeronautical Corp.

"British Thought and Practice: How They Differ From American", by W. H. Tait, Glacier Metals Co. Ltd.

ELECTRONIC METHODS OF INSPECTION OF METALS

Eight Lectures—Five Sessions

Mon., Tues., Wed. and Thurs., Nov. 18, 19, 20 and 21—3:00 P. M.; Fri., Nov. 22—2:00 P. M.

"Electronic Methods for the Measurement of Stress in Metals (According to the Baldwin SR-4 Strain Gage)", by Henry Hamburg, Chance Vought Aircraft Co.

"Direct Spectrochemical Analysis, Photo-Electric Recording", by J. L. Saunderson, Dow Chemical Co.

"Uses of the DuMont Cyclograph for Testing of Metals", by R. S. Segsworth, General Engineering Co., Ltd.

"Supersonic Inspection of Metals", by E. O. Dixon, Ladish Drop Forge Co.

"Determination of Seams in Steels by Magnetic Analysis Equipment", by Charles Lickey, Jones & Laughlin Steel Corp.

"The Electron Microscope and Its Application to Metals", by C. S. Barrett, University of Chicago.

"Electronics in Liquid Steel", by Harold T. Clark, Jones & Laughlin Steel Corp.

"The Metalsorter", by G. H. Tyne, Controlled Plating Co.

THE STRUCTURE OF CAST IRON

By Alfred Boyles,
U. S. Pipe & Foundry Co.

Three Lectures

Wed., Nov. 20—8:00 P. M.; Thurs. and Fri., Nov. 21 and 22—2:00 P. M.

PHYSICAL METALLURGY OF ALUMINUM

Five Lectures

Mon., Tues. and Wed., Nov. 18, 19 and 20—8:00 P. M.; Thurs., Nov. 21—4:00 P. M.; Fri., Nov. 22—2:00 P. M.

"Constitution of Aluminum Alloys", by W. L. Fink.†

"Metallography of Aluminum Alloys", by F. Keller.†

"Commercial Cast Aluminum Alloys", by W. E. Sicha.†

"Commercial Wrought Aluminum Alloys", by J. A. Nock, Jr.†

"Thermal Treatments of Aluminum Alloys", by E. H. Dix, Jr.†

†*All members of the staff of Aluminum Co. of America.*

PROGRAM . . .

AMERICAN WELDING SOCIETY

All Meetings—Ambassador Hotel

Sunday, Nov. 17—5:00 to 7:00 P.M.

PRESIDENT'S RECEPTION—
CLUB 22

Monday, Nov. 18—9:30 A.M.

RENAISSANCE ROOM

Weldability

Chairman—Gilbert E. Doan, Lehigh University.

Vice-Chairman—Clarence E. Jackson, Union Carbide & Carbon Research Laboratories.

"Cracking and Ductility in the Heat-Affected Zone of Metal Arc Welds", by C. B. Voldrich, Battelle Memorial Institute.

"An Investigation of the Effect of Welding on the Transition Temperatures of Navy High-Tensile Low-Alloy Steels", by G. G. Luther, R. E. Metius, C. E. Hartbower and F. H. Laxar, Naval Research Laboratory.

"Influence of Geometrical Restraint and Temperature on the Toughness and Mode of Rupture of Structural Steel", by A. R. Anderson and A. G. Waggoner, Cramp Shipbuilding Corp.

VENETIAN ROOM

Electrodes

Chairman—J. H. Deppeler, Metal & Thermit Corp.

Vice-Chairman — J. H. Humberstone, Arcrods Corp.

"The E601X Electrode Group", by Orville T. Barnett, Metal & Thermit Corp.

"Some Recent Developments in the Manufacture of Fluxes for Automatic Submerged Arc Welding", by Willi M. Cohn, consulting engineer and physicist.

"Development and Application of Lime Ferritic Electrodes", by D. L. Mathias and A. P. Bunk, Metal & Thermit Corp.

CLUB 22

Railroad

Chairman—A. G. Oehler, Associate Editor, *Railway Age.*

Vice-Chairman—J. W. Sheffer, American Car and Foundry Co.

"Quantity Production of Railroad Passenger Cars by Resistance Welding", by A. M. Unger, Pullman-Standard Car Manufacturing Co.

"Locomotive Boilers—Welded Construction", by James Partington, American Locomotive Co.

"Welded Freight Car Construction", by R. L. Rex, Air Reduction Sales Co.

Monday, Nov. 18—2:00 P.M.

RENAISSANCE ROOM

Research

Chairman—G. E. Claussen, Chairman, University Research Committee.

Vice-Chairman—Marvin Sedam, Alloy Rods Co.

"Arc Atmospheres and Underbead Cracking", by M. W. Mallett and P. J. Rieppel, Battelle Memorial Institute.

"The X-Ray Diffraction Study of the Effect of Residual Compression on the Fatigue of Notched Specimens", by J. T. Norton, D. Rosenthal and S. B. Maloof, Massachusetts Institute of Technology.

"The Weldability of Ship Steels: Effects of Travel Speed, Preheat Temperature, and Arc Power Level on Notch Toughness", by Ernest E. Nippes and Warren F. Savage, Rensselaer Polytechnic Institute.

"Some Observations on the Weldability of High-Strength Wrought Aluminum Alloys", by W. R. Apblett, Naval Research Laboratory.

VENETIAN ROOM

Production

Chairman—J. J. Chyle, A. O. Smith Corp.

Vice-Chairman—F. J. Whitney, Jr., Heintz Manufacturing Co.

"Automatic Gas Shielded Welding", by G. J. Gibson, Air Reduction Sales Co.

"Jigs and Fixtures for Automatic Fusion Welding", by L. J. Berkeley, Penn Tool and Machine Co., and E. D. Morris, Linde Air Products Co.

"Tool and Die Welding", by A. R. Butler and Frank E. Kessler, Welding Equipment & Supply Co.

"Welding of Electric Apparatus", by E. F. Potter, Works Laboratory, General Electric Co.

CLUB 22

Storage Tanks and Pressure Vessels

Chairman—H. O. Hill, Bethlehem Steel Co.

Vice-Chairman—Harry Irrgang, W. K. Mitchell Co.

"Field Erected Pressure Vessels", by Fred L. Plummer, Hammond Iron Works.

"Dry Seal Gas Holders, All-Welded", by Rudolf Kraus, Stacey Bros. Gas Construction Co.

"Submerged-Melt Welding in Pressure Vessel Fabrication", by N. G. Schreiner, Linde Air Products Co.

Monday, Nov. 18—8:00 P.M.

RENAISSANCE ROOM

Adams Lecture

Chairman—J. D. Gordon, Progressive Welder Co.

Vice-Chairman—W. G. Theisinger, Lukens Steel Co.

Adams Lecture, by Wendell F. Hess Rensselaer Polytechnic Institute

Tuesday, Nov. 19—9:30 A.M.

RENAISSANCE ROOM

Research

Chairman—Charles H. Jennings, Westinghouse Electric Corp.

Vice-Chairman—George G. Luther, Naval Research Laboratory.

"Computation of Cooling Time in Butt Welds", by D. Rosenthal, Massachusetts Institute of Technology.

"Effect of Peening on Residual Welding Stresses", by Paul DeGarmo, Finn Jonassen and J. L. Meriam, University of California.

"Welding of High-Strength Steels With Ferritic Electrodes", by S. A. Herres and P. E. Woodward, Watertown Arsenal Laboratory.

VENETIAN ROOM

Resistance Welding

Chairman—R. E. Powell, Western Electric Co.

Vice-Chairman—B. L. Wise, National Electric Welding Machines Co.

"Flash Welding of Concentrated Areas Up to 24 Sq. In. in S.A.E. 1020, N.E. 9440, and N.E. 8620 Steels", by D. Bruce Johnston, McPhee and Johnston.

"Resistance Welding of Spring Steel to Low-Carbon Steel", by Arthur Willink, registered professional engineer.

"Design for Resistance Welding", by I. A. Crawford, Ex-Cell-O Steel Products Co.

CLUB 22

Machinery

Chairman—L. S. McPhee, Whiting Corp.

Vice-Chairman—A. J. Raymo, Baldwin Locomotive Works.

"The Metallurgical Effect of Flame Hardening Application", by O. M. Harrelson, Georgia School of Technology.

"The Evolution of Diesel Engine Block Weldment Designs", by James W. Owens, Fairbanks-Morse & Co.

"Coordination of Engineering and Production in the Manufacture of Welded Products", by E. C. Brekelbaum, Harnischfeger Corp.

Tuesday, Nov. 19—2:00 P.M.

RENAISSANCE ROOM

Research

Chairman—John W. Gore, Bethlehem Steel Co., Baltimore Yard.

Vice-Chairman—H. L. Ingram, Jr., Air Reduction Sales Co.

"Redistribution of Residual Welding Stresses by Tensile Loading Along a Unionmelt Weld Joining two 3-Ft. x 12-Ft. x 1-In. Plates", by J. L. Meriam, E. Paul DeGarmo and Finn Jonassen, University of California.

"Welding Research as Applied in the South", by W. W. Austin, Jr., and E. N. Kemler, Southern Research Institute.

"Welding of Hardenable Steels With High-Alloy (Austenitic) Electrodes" by Miss A. M. Turkalo and Capt. S. A. Herres, Watertown Arsenal Laboratory.

"An Investigation of the Phenomenon of Cleavage-Type Fractures in Low-Alloy Structural Ship Steels", by H. J. Gershenow and G. G. Luther, Naval Research Laboratory.

VENETIAN ROOM

Resistance Welding

Chairman—R. T. Gillette, General Electric Co.

Vice-Chairman — George N. Sieger, S-M-S Corp.

"Resistance Welding With Storage Batteries", by John D. Gordon, Progressive Welder Co.

"A Summary of the Spot Welding of High-Tensile Carbon and Low-Alloy Steels", by W. D. Doty and Wylie J. Childs, Rensselaer Polytechnic Institute.

"Selecting Spot Welding Schedules for Low-Carbon Steel", by Julius Heuschkel, Westinghouse Electric Laboratories.

CLUB 22

Shipbuilding

Chairman—H. W. Pierce, New York Shipbuilding Corp.

Vice-Chairman—T. M. Jackson, Sun Shipbuilding & Dry Dock Co.

"Some Problems of Welding Design and Fabrication of Steel Floating Dry Docks", by A. Amirikian, Bureau of Yards and Docks, Navy Department.

"Control of Welding Stresses by Welding Sequence", by Paul Field, Shipbuilding Division, Bethlehem Steel Co.

"Discussion—Final Report of the Board to Investigate the Design and Methods of Construction of Welded Steel Merchant Vessels", by Comdr. R. D. Schmidtman, J. Lyell Wilson and Finn Jonassen, members of the Sub-Board.

Tuesday, Nov. 19—8:00 P.M.

ROOM 125

University Research Conference

Wednesday, Nov. 20—9:30 A.M.

RENAISSANCE ROOM

Cutting

Chairman—John J. Crowe, Air Reduction Sales Co.

Vice-Chairman—A. B. Gordon, Linde Air Products Co.

"Automatic Oxy-Acetylene Operations", by S. D. Baumer, Air Reduction Sales Co.

"Heavy Cutting Applications in Foundry and Steel Mill", by R. S. Babcock, Linde Air Products Co.

"Stainless Steel Cutting", by Howard Hughey, Air Reduction Sales Co.

VENETIAN ROOM

Resistance Welding

Chairman—O. C. Frederick, General Electric Co.

Vice-Chairman—John Cumberland, Arcway Equipment.

"Additional Timing Period of New Motor-Driven Control Increases Gun Welder Speed", by H. I. Stanback, Square D Co.

"Radiography and the Fatigue Strength of Spot Welds in Aluminum Alloys", by Robert C. McMaster and Horace J. Grover, Battelle Memorial Institute.

"Resistance Welding"—A General Electric film to be shown by L. D. T. Berg, General Electric Co.

CLUB 22

Structural

Chairman—F. H. Frankland, consulting engineer.

Vice-Chairman—W. E. Hendricks, Belmont Iron Works.

"H-Section Welded Trusses", by A. T. Waidelich, Austin Co.

"Welded Pier Leg, Shear Leg and Trolley of a 15-Ton Ore Bridge", by Geo. F. Wolfe, Dravo Corp.

"Recent Trends in Concepts of Design for Welded Steel Structures", by LaMotte Grover, Air Reduction Sales Co.

Wednesday, Nov. 20—2:00 P.M.

RENAISSANCE ROOM

Resistance Welding

Chairman—K. W. Ostrom, K. W. Ostrom & Co.

Vice-Chairman—E. S. Elwood, Denton and Anderson Co.

"Choice of Cable and Transformer Size for Portable Spot Welder", by Myron Zucker, MacKworth G. Rees, Inc.

"Three-Phase Balanced Load Resistance Welding Machines", by Mario Sciaky, Sciaky Brothers Co. Inc.

"The Flash Welding of Hard Drawn High-Carbon Steel Wire", by R. W. Bennett and R. D. Williams, Battelle Memorial Institute.

VENETIAN ROOM

Cutting

Chairman—J. H. Zimmerman, Linde Air Products Co.

Vice-Chairman—John D. Bert, Philadelphia Navy Yard.

"Arc-Oxygen Cutting on the Surface and Under Water", by Charles Kandel, Craftsweld Equipment Corp.

"Powder Cutting and Scarfing of Oxidation Resistant Materials", by D. H. Fleming, Linde Air Products Co.

"Some Recent Canadian Contributions to Oxygen Cutting", and Film "No Keener Blade", by R. A. Dunn, Canadian Liquid Air Co., Ltd.

"Oxygen Cutting of Steel at Elevated Temperatures", by J. F. Kiernan and J. S. Sohn, Air Reduction Sales Co.

CLUB 22

Welding Alloy Steels

Chairman—R. D. Thomas, Jr., Arcos Corp.

Vice-Chairman—A. A. Holzbaur, Sun Shipbuilding Co.

"Investigation of the Weldability of Copper-Bearing Steels", by N. H. Keyser and C. H. Lorig, Battelle Memorial Institute.

"The Control of Weld Hot Cracking in Nickel-Chromium-Iron Alloys", by T. E. Kihlgren and C. E. Lacy, International Nickel Co., Research Laboratory.

"The Development and Applications of High-Strength Welding Quality Alloy Steels", by Howard L. Miller, Republic Steel Corp.

"Navy-E.E.S. Method for Determining the Applicable Welding Procedures for Steels", by Bela Ronay, U. S. Naval Engineering Experiment Station.

Wednesday, Nov. 20—8:00 P.M.

RENAISSANCE ROOM

Section Activities

Chairman—F. W. Davis, Chairman, Section Advisory Committee.

Vice-Chairman—J. F. Maine, Past Chairman, Cleveland Section.

Section Officers will hold their Annual Dinner in the Venetian Room at 6:30 P.M. to be followed by a special open session on Section operation involving presentation of papers and discussion by Section Representatives.

Thursday, Nov. 21—9:30 A.M.

RENAISSANCE ROOM

Pressure Welding

Chairman—A. B. Kinzel, Union Carbide & Carbon Research Laboratories.

Vice-Chairman—A. T. Light, York Corp.

"Open Butt Oxy-Acetylene Compression Welding", by H. H. Chiswik, Air Reduction Sales Co.

"Pressure Welding of Low-Alloy Steels and Some Nonferrous Alloys", by K. H. Koopman, Union Carbide & Carbon Research Laboratories, Inc.

"Welding of Stainless Steel Rings", by C. J. Burch, Linde Air Products Co., A. L. Rustay, Stephen Jablonski and Alan Crowell, Wyman-Gordon Co.

"Pressure Gas Welding of Alloy Steel Tubing", by Z. L. Zambrow and R. D. Williams, Battelle Memorial Institute.

VENETIAN ROOM

Aircraft

Chairman—G. S. Mikhalapov, Air Reduction Sales Co.

Vice-Chairman—P. H. Merriman, The Glenn L. Martin Co.

"Design and Production Control Silver Alloy Brazed Joints in Aircraft Structures", by H. A. Smith and P. A. Koerner, Beech Aircraft Co.

"Resistance Welding Test Methods Used to Maintain Quality in the Manufacture of the 140 Jet Engine", by P. G. Parks, Solar Aircraft Co.

"Welding Problems in Jet Propulsion—Stainless Steel", by E. J. DeWitt and Mr. Lammers, Wallace Supplies Mfg. Co.

CLUB 22

Hard Facing

Chairman—A. V. Harris, Haynes Stellite Co.

Vice-Chairman—M. W. Brewster, Westinghouse Electric Corp.

"Repairing Contractors and Steel Mill Equipment with Manganese Application Bars", by L. A. Davis, Manganal Div. Stulz Sickles Co.

"How to Select Wear Resisting Alloys for Welding", by Joseph A. Cunningham, J. A. Cunningham Equipment, Inc.

"Microstructure of Hard Facing Alloys", by H. W. Sharp, Stoody Co.

"Composite Construction by Building Up Surfaces With Submerged-Melt Welding", by J. E. Taylerson, Linde Air Products Co.

Thursday, Nov. 21—7:00 P.M.

RENAISSANCE ROOM

Annual Dinner

Presentation of Medals and Prizes

Chairman—Wendell F. Hess, President, American Welding Society.

Vice-Chairman—E. V. David, Chairman, Convention Committee.

Friday, Nov. 22—9:30 A.M.

RENAISSANCE ROOM

High Alloys

Chairman—R. D. Thomas, Sr., Arcos Corp.

Vice-Chairman—E. R. McClung, Lukenweld, Inc.

"An Attempt to Select a Suitable Specimen for the Study of Corrosion Cracking in 18-8 Steel", by D. S. McKinney, Carnegie Institute of Technology.

"Welding and Other Fabrication Methods for Hastelloy Alloys", by C. G. Chisholm, Haynes Stellite Co.

"Effect of Alloying Elements on the Tensile Properties of 25-20 Weld Metal", by Hallock C. Campbell and R. D. Thomas, Jr., Arcos Corp.

VENETIAN ROOM

Miscellaneous

Chairman—H. B. Seydel, Air Reduction Sales Co.

Vice-Chairman—G. R. Johnson, Lincoln Electric Co.

"The Arc Welding of Cast Iron With

Nickel Electrodes", by T. E. Kihlgren and L. C. Minard, International Nickel Co., Research Laboratory.

"The Welding of High Temperature, High Pressure Steel Valves", by Vincent Malcolm, Chapman Valve Co.

"Static and Fatigue Tests of Arc Welded Aluminum Alloy 61S-T Plate", by E. C. Hartmann, Marshall Holt and A. N. Zamboky, Aluminum Research Laboratories.

CLUB 22

Miscellaneous

Chairman—G. V. Slottman, Air Reduction Sales Co.

Vice-Chairman—L. D. T. Berg, General Electric Co.

"Submerged-Melt Welding of Corrosion Resisting Metals", by H. J. Roberts, Linde Air Products Co., and R. J. Anderson, Dominion Oxygen Co., Ltd.

"Production Applications of Inert-Gas Shielded Arc Welding", by H. T. Herbst, Linde Air Products Co.

"A New Semiautomatic Arc Welding Process", by J. M. Tyrner, Air Reduction Sales Co.

Friday, Nov. 22—2:00 P.M.
VENETIAN ROOM
Business Meeting
Friday, Nov. 22—3:00 P.M.
VENETIAN ROOM
Board of Directors Meeting

PROGRAM . . .

Iron and Steel and Institute of Metals Divisions

AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS

All Meetings—Hotel Claridge
Monday, Nov. 18—10:00 A.M.
GENERAL TECHNICAL SESSION
Iron and Steel Division

"German Iron Ores Yield Vanadium", by R. P. Fischer.

"Controlled Atmospheres From City Gas for the Heat Treatment of Steels", by Ivor Jenkins.

"Production of Low-Sulphur Sponge Iron", by R. C. Buehl, E. P. Shoub and J. P. Riott.

Monday, Nov. 18—10:30 A.M.
ALUMINUM ALLOYS
Institute of Metals Division

"Precipitation in Age Hardened Aluminum Alloys", by A. H. Geisler and F. Keller.

"Stress-Rupture and Creep Tests on Aluminum Alloy Sheet at Elevated Temperatures", by A. E. Flanagan, L. F. Tedsen and J. E. Dorn.

Monday, Nov. 18—12:30 P.M.
EXECUTIVE COMMITTEE LUNCHEON AND MEETING
Institute of Metals Division

Monday, Nov. 18—2:00 P.M.
JOINT TECHNICAL SESSION ON MAGNESIUM ALLOYS AND OXIDE FILMS
Iron and Steel and Institute of Metals Divisions

"Hydrogen in Magnesium Alloys", by R. S. Busk and E. G. Bobalek.

"Some Effects of Zirconium on the Extrusion Properties of Magnesium-Base Alloys Containing Zinc", by J. P. Doan and G. Ansel.

"An Electron Diffraction Study of Oxide Films Formed on Fe, Co, Ni, Cr and Cu at High Temperatures", by E. A. Gulbransen and J. W. Hickman.

"An Electron Diffraction Study of Oxide Films Formed on Alloys of Fe, Co, Ni and Cr at High Temperatures", by J. W. Hickman and E. A. Gulbransen.

Monday, Nov. 18—2:00 P.M.
METALLOGRAPHY
Iron and Steel Division

"Hot Deformation Structures, Banding and Red Shortness Cracks in Steel", by A. Hultgren and B. Herrlander.

"Transformation of Austenite in an Aluminum-Chromium-Molybdenum Steel", by R. A. Grange, W. S. Holt and E. T. Tkac.

"Effect of Alloys in Steel on Resistance to Tempering", by Walter Crafts and J. L. Lamont.

"Calculation of Tensile Strength and Yield Point from the Chemical Composition and Cooling Rate", by I. R. Kramer, P. D. Gorsuch and D. L. Newhouse.

"Boron in Certain Alloy Steels", by M. C. Udy and P. C. Rosenthal.

Tuesday, Nov. 19, 9:00—10:30 A.M. and 2:00—4:30 P.M.
JOINT SYMPOSIUM ON EFFECTS OF MULTIAXIAL STRESSES ON METALS
Iron and Steel and Institute of Metals Divisions

"Mechanical Equation of State", by J. H. Hollomon.

"A Statistical Theory of Fracture", by J. C. Fisher and J. H. Hollomon.

"A Thermodynamic Theory of the Fracture of Metals", by E. Saibel.

"Work Hardening and Rupture in Metals", by L. R. Jackson.

"Comparison of Various Structural Alloy Steels by Means of the Static Notched-Bar Tensile Test", by G. Sachs, L. F. Ebert and W. F. Brown, Jr.

"Plastic Flow of Aluminum Alloy Sheet Under Combined Loads", by W. T. Lankford, J. R. Low and M. Gensamer.

"Problems in Unstable Flow under Biaxial Stresses", by W. T. Lankford and E. A. Saibel.

Tuesday, Nov. 19—10:45 A.M.
Institute of Metals Division
1946 Annual Lecture by William Hume-Rothery of Oxford University, England

Tuesday, Nov. 19—12:30 P.M.
EXECUTIVE COMMITTEE LUNCHEON AND MEETING
Iron and Steel Division

Tuesday, Nov. 19—2:00 P.M.
GENERAL TECHNICAL SESSION
Institute of Metals Division

"Some Factors Affecting the Particle Size of Tungsten", by Bernard Kopelman.

"Spot Welding of Titanium", by R. S. Dean, J. R. Long, E. T. Hayes and D. C. Root.

"Melting of Molybdenum in Vacuum Arc", by R. M. Parke and J. L. Ham.

"Solubility of Hydrogen in Electrolytic Manganese and Transition Points in Electrolytic Manganese", by E. V. Potter and H. C. Lukens.

Tuesday, Nov. 19—6:30 P.M.
ANNUAL FALL DINNER
Iron and Steel and Institute of Metals Divisions

Wednesday, Nov. 20—2:00 P.M.
PHYSICAL CHEMISTRY OF BLAST FURNACE AND OPENHEARTH
Iron and Steel Division

"An Electrochemical Study of the Properties of Molten Slags of the Systems $CaO\text{-}SiO_2$ and $CaO\text{-}Al_2O_3\text{-}SiO_2$", by L. C. Chang and Gerhard Derge.

"Oxygen in Liquid Openhearth Steel. II—Oxygen Content During the Refining Period", by T. E. Brower and B. M. Larsen.

"Oxygen in Liquid Openhearth Steel. Effect of Special Additions, Stirring Methods and Tapping", by T. E. Brower and B. M. Larsen.

Wednesday, Nov. 20—2:00 P.M.
COPPER ALLOYS, METALLOGRAPHY
Institute of Metals Division

"Twin Relationships in Annealed Copper Strip", by P. Coheur and C. S. Barrett.

"Twinning in Polycrystalline Magnesium", by C. S. Barrett, C. T. Haller.

"Zinc Diffusion in Alpha Brass", by A. D. Smigelskas and E. O. Kirkendall.

"Alpha Solid Solution Area of Copper-Manganese-Aluminum System", by R. S. Dean, J. R. Long, T. R. Graham, A. H. Roberson, C. E. Armantrout.

PROGRAM . . .

American Industrial

RADIUM AND X-RAY SOCIETY INC.

All Meetings in Main Ballroom, Seaside Hotel

Wednesday, Nov. 20—9:30 A.M.

Quantitative Measurement of Penetrating Radiation

Technical Chairman—Lloyd W. Pote, chairman, Boston Section.

"Quantitative Measurements by Controlled Process Film of Two Million Volt X-Radiation", by Donald T. O'Connor, Naval Ordnance Laboratory.

"Quantitative Relations Between the Photographic Response of Typical X-Ray Films and the Quality of Radiation", by Victor Hicks and H. W. Hoerlin, Ansco.

"Sliding Scales to Increase the Usefulness of Radiographic Exposure Charts", by Herman E. Seemann and George M. Corney, Eastman Kodak Co.

"Applications of G-M Counters to Measurement of X-Ray and Gamma-Ray Intensities", by Herbert Friedman, Naval Research Laboratory.

Wednesday, Nov. 20—2:00 P.M.

Commercial and Research Applications of Radiography

Technical Chairman—Paul F. Duttenhofer, chairman, Philadelphia Section.

"Design, Manufacture and Inspection of Welded Fabrications", by Gerald H. Campbell, A. O. Smith Corp.

"X-Ray Inspection of Rocket Propellants", by Joseph E. Watkins, General Electric X-Ray Corp.

"Radiography of Heavy Radioactive Materials", by Gerold H. Tenney, Los Alamos Project.

"Gamma-Ray Radiography in a Small Steel Foundry", by Robert A. Willey, Commercial Steel Casting Co.

Thursday, Nov. 21—9:30 A.M.

Radiation Methods for Fine Structure Analysis

Technical Chairman — R. V. Lange, chairman, New York Section.

"A Study of the Microstructure of Some Nonferrous Alloys by Means of Microradiography", by Louis Conant, Lithaloys Corp.

"X-Ray and Optical Micrography as Essentials to Correlation of Radiographic Appearance With the Serviceability of Metal Parts", by Leslie W. Ball, Naval Ordnance Laboratory.

"Microscopy and Analysis With Electrons" by James Hillier, Radio Corp. of America.

"Short Source-Object-Distance Exposure Techniques in Spot Weld Radiography", by Robert C. McMaster, Battelle Memorial Institute.

Thursday, Nov. 21—2:00 P.M.

Annual Meeting

Election of Officers.

"The Retiring President's Address", by Kent R. Van Horn.

The 1946 Mehl Lecture

"Photographic Aspects of Industrial Radiography", by Herman E. Seemann, Eastman Kodak Co.

"Presentation of the Mehl Lecture Award", by Kent R. Van Horn.

Friday, Nov. 22—9:30 A.M.

Technique and Diagnosis Standardization

Technical Chairman—Norman Deuel, chairman, Baltimore Section.

"Logarithmic Step-Tablet for X-Rays", by George M. Corney, Eastman Kodak Co.

"Further Studies of High-Voltage Radiography", by E. Dale Trout, General Electric X-Ray Corp.

"Radiographic Specifications, Their Nature, Purpose and Current Revisions", by J. Jerome Pierce, Naval Ordnance Laboratory.

Friday, Nov. 22—2:00 P.M.

Nondestructive or Allied Test Methods

Technical Chairman—Lt. Comdr. W. W. Chambers, Naval Medical Center.

"Spectrographic Analysis of Cartridge Brass", by M. M. White, Willys-Overland Motors, Inc.

"Proof Loading—An Essential Nondestructive Test", by John C. New, Naval Ordnance Laboratory.

"Analysis of Drillings and Chips by Sintering Pellets of the Material", by M. M. White, Willys-Overland Motors, Inc.

"Testing Metals for Internal Discontinuities With Supersonic Echoes", by J. W. Dice, Sperry Products, Inc.

(Admission to sessions of the convention is by membership card only.)

EXHIBITORS...

NATIONAL METAL EXPOSITION

A

Acme Electric Welder Co., Los Angeles G224
Acme Tool Co., New York B232
Acro Welder Mfg. Co. Inc., Milwaukee G224
Air Reduction Sales Co., New York A152
Aircraft Screw Products Co. Inc., Long Island City B202
Ajax Electric Co., Inc., Philadelphia B155
Ajax Electrothermic Corp., Trenton, N. J. B147
Alien Property Custodian, Washington, D. C. H-238
Allis-Chalmers Mfg. Co., Milwaukee C251
Alloy Rods Corp., York, Pa. ..... G-156 & G-160
Alox Corp., Niagara Falls, N. Y. A163
Alvey-Ferguson Co., The, Cincinnati A230
American Electro Metal Corp., Yonkers, N. Y. F-249
American Emblem Co., Utica, N. Y. H176
American Foundry Equipment Co., Mishawaka, Ind. B115
American Gas Association, New York G169
American Gas Furnace Co., Elizabeth, N. J. G169
American Machinist, New York F169
American Metal Market, New York H227
American Photocopy Equipment Co., Chicago J232
American Smelting & Refining Co., New York (Federated Metals Division) E178
American Society for Metals, Cleveland F181
American Society for Metals, Newark, N. J. (New Jersey Chapter) D224
American Steel Castings Co., Newark, N. J. A109
American Technical Society, Chicago H224
American Welding Society, New York D180
Ampco Metal, Inc., Milwaukee B214
Anderson & Sons, Westfield, Mass. A173
Anderson Oil Co., F. E., Portland, Conn. E232
Arcos Corp., Philadelphia A115
Atlas Fence Co., Philadelphia G207
Austenal Laboratories, Inc., New York C224
Aviation Maintenance, Chicago D210

B

Babcock & Wilcox Co., The, New York E143
Baird Associates, Cambridge, Mass. F247
Baker & Co., Inc., Newark, N. J. C225
Baldwin Locomotive Works, Philadelphia G115

Barrett-Cravens Co., Chicago B169
Bastian-Blessing Co., The, Chicago E120
Bausch & Lomb Optical Co., Rochester B152
Bergen Precision Castings Inc., Pleasantville, N. Y. C162
Better Finishes & Coatings Inc., Newark, N. J. A158
Black Drill Co., Cleveland C109
Blakeslee & Co., G. S., Chicago D205
Bowser, Inc. (Refrigeration Division), Terryville, Conn. G238
Bristol Co., The, Waterbury, Conn. C142
Brown Instrument Co., Philadelphia B105
Bruning Company, Inc., Charles, Chicago G142
Brush Beryllium Co., Cleveland G214
Bryant Heater Co., Cleveland G169
Buehler, Ltd., Chicago D119
Burkay Co., Toledo, O. B173
By-Products Steel Corp., Coatesville, Pa. D155

C

Cambridge Wire Cloth Co., Cambridge, Md. F210
Canadian Radium & Uranium Corp., New York F209
Carbomatic Corp., New York G169
Carpenter Steel Co., The, Reading, Pa. C169
Central Scientific Co., Chicago B109
Champion Rivet Co., Cleveland F142
Chayes Dental Instrument Corp., New York F246
Cherry Rivet Co., Los Angeles B108
Climax Molybdenum Co., New York H151
Commerce Pattern Foundry & Machine Co., Detroit E204
Conover-Mast Corp., Chicago D210
Continental Industrial Engineers Inc., Chicago G169
Crown Rheostat & Supply Co., Chicago E157
Crucible Steel Co. of America, New York E147

D

DCMT Die Casting Machine Tool Corp., New York C131
Delaware Tool Steel Corp., Wilmington, Del. B180
Dempsey Industrial Furnace Corp., Springfield, Mass. B132
Denison Engineering Co., Columbus, O. F135
deSanno & Son, Inc., A. P., Phoenixville, Pa. A181
Detroit Testing Machine Co., Detroit B158
Diamond Machine Tool Co., Los Angeles H246
Die Casting, Cleveland F238
Dietert Co., Harry W., Detroit C120
Diversey Corp., The, Chicago B143
DoAll Co., The, Minneapolis, Minn. B139
Donovan Co., Philadelphia G211
Drever Co., Philadelphia C229
Driver Co., Wilbur B., Newark, N. J. E238
DuMont Laboratories, Allen B., Passaic, N. J. E221
Duraloy Co., The, Scottdale, Pa. F176

E

East Shore Machine Products Co., Cleveland I232
Eastern Stainless Steel Corp., Baltimore B185
Eastman Kodak Co., Rochester C155
Ecco High Frequency Corp., North Bergen, N. J. A133
Eclipse Fuel Engineering Co., Rockford, Ill. G169
Eisler Engineering Co., Newark, N. J. F227
Electric Furnace Co., The, Salem, O. D169
Electro Tech Equipment Co., New York F-233
Electroloy Co. Inc., The, Bridgeport, Conn. G224
Elox Corp., Clawson, Mich. F158
Empire Steel Castings Inc., Reading, Pa. D238
Eutectic Welding Alloys Corp., New York ..... A180 & G103
Expert Welding Machine Co., Detroit F229

F

Fab-Weld Corp., Philadelphia G205
Fast Feed Machine Corp., New York J-226
Federal Machine & Welder Co., Warren, O. F125
Fen Machine Co., Euclid, O. F237
Finnell System, Inc., Elkhart, Ind. E215
Force & Co., Wm. A., Brooklyn, N. Y. E239
Foundry, The, Cleveland, ... A105
Foxboro Co., The, Foxboro, Mass. B142
Frontier Bronze Corp., Niagara Falls, N. Y. E237

G

Gamma Instrument Co., Inc., New York H143
Garret Co., George K., Philadelphia A237
Gas Machinery Co., Cleveland G169
Gehnrich & Gehnrich Inc., Woodside, L. I., N. Y. G169
General Alloys Co., Boston D109
General Aniline & Film Corp., Johnson City, N. Y. F204
General Electric Co., Schenectady, N. Y. H139
General Electric X-Ray Corp., Chicago H139
Goodrich Company, The B. F., Akron, O. G173
Goodwin Co., Cuyahoga Falls, O. I232
Gordon Electronics Inc., Pittsburgh F134
Gray-Mills Corp., Evanston, Ill. E210
Grobet File Co. of America, New York B238
Gulf Oil Corp., Philadelphia D108

H

H & H Research Co., Detroit B232
Hager & Son, E. F., Queens Village, L. I., N. Y. E227
Hammond Machinery Builders Inc., Kalamazoo Mich. A138
Handy & Harman, New York F147
Harnischfeger Corp., Milwaukee D175
Hauck Mfg. Co., Brooklyn, N. Y. H165
Hayes Inc., C. I., Providence, R. I. E250
Heller Brothers Co., Newark, N. J. D227
Hevi Duty Electric Co., Milwaukee E142
Hitchcock Publishing Co., Chicago I228
Holden Co., The A. F., New Haven, Conn. D125
Holliday & Co., W. J., Hammond, Ind. G119
Hollup Corp., Chicago E119
Hones Inc., Charles A., Baldwin, L. I., N. Y. G169
Houghton & Co., E. F., Philadelphia D115
Huppert Co., K. H., Chicago C173

I

Illinois Testing Laboratories Inc., Chicago A245
Induction Heating Corp., New York D162
Industrial Bulletin, Chicago G210
Industrial Heating, Pittsburgh B208
Industrial Press, The, New York B246
Industrial Publishing Co., The, Cleveland F238
Industrial Radiography, Chicago B204
Industrial Tape Corp., Brunswick, N. J. A224
Industry & Welding, Cleveland F238
Instrument Specialties Co. Inc., Little Falls, N. J. D134
Intercontinental Engineers, Chicago G169
International Nickel Co., New York ..... Stage
Iron Age, The, New York A142

J

Jackson Products, Detroit B220
Janney Cylinder Co., Holmesburg, Philadelphia D209
Jessop Steel Co., Washington, Pa. C180
Johnson Fuller Co., Los Angeles B162
Jones Co., C. Walker, Philadelphia B177
Jones & Laughlin Steel Corp., Pittsburgh A132
Joslyn Mfg. & Supply Co., Fort Wayne, Ind. C147

K

Kemp Mfg. Co., C. M., Baltimore G169
Kerkling & Co., Chicago I224
Kerr Mfg. Co., Detroit B237
Kewaunee Mfg. Co., Adrian, Mich. I233
King Co., Andrew, Narberth, Pa. E162
Knu-Vise Inc., Detroit I226
Kolene Corp., Detroit J233
Krieg Co., Charles W., Newark, N. J. F180
Krouse Testing Machine Co., Columbus, O. D245
Kux Machine Co., Chicago D237

L

Lancaster Iron Works, Lancaster, Pa. C238
Latrobe Electric Steel Co., Latrobe, Pa. E169
Lea Mfg. Co., Waterbury, Conn. G232
Lead Industries Association, New York B226
Leeds & Northrup Co., Philadelphia A122
Lepel High Frequency Laboratories Inc., New York G105
Lester-Phoenix Co., Cleveland G146
Lincoln Electric Co., Cleveland E139
Lincoln Engineering Co., St. Louis D246
Lindberg Engineering Co., Chicago D139
Lobdell Co., Wilmington, Del. B236
Lukens Steel Co., Coatesville, Pa. D155
Lukenweld Inc., Coatesville, Pa. D155

M

Maas & Waldstein Co., Newark, N. J. G177
Mabor Co., Rahway, N. J. F215
Machine Design, Cleveland A105
Machine Tool Blue Book, Chicago I228
Machinery, New York B246
Magnaflux Corp., Chicago D176
Magnesium Association, The, New York G108
Magnetic Analysis Corp., Long Island City, N. Y. F245
Mahr Mfg. Co., Minneapolis, Minn. C176
Malleable Founders' Society, Cleveland G215
Mallory & Co. Inc., P. R., Indianapolis, Ind. G228
Martindale Electric Co., The, Lakewood, O. E229
Materials & Methods, New York C181
McAleer Mfg. Co., Rochester, Mich. A137
McGraw-Hill Publishing Co., New York F169
McIntyre Co., The, Newton, Mass. B245

McKay Co., The, Pittsburgh F220
Meehanite Metal Corp., New Rochelle, N. Y. E153
Metal Finishing Service, Chicago C221
Metal Industries Catalog, New York C181
Metal Industry Publishing Co., New York F214
Metal Progress, Cleveland F181
Metal & Thermit Corp., New York F153
Metals Review, Cleveland F181
Metlab Co., Philadelphia C158
Michiana Products Corp., Michigan City, Ind. G109
Michigan Steel Casting Co., Detroit G125
Mid-Continent Metal Products Co., Chicago G169
Mid-States Equipment Corp., Chicago D138
Mill & Factory, Chicago D210
Mines Safety Appliances Co., Pittsburgh B119
Minneapolis-Honeywell Regulator Co., Philadelphia B105
Miskella Infra-Red Co., Cleveland A235
Modern Metals, Chicago A205
Molybdenum Corp. of America, Pittsburgh D143
Motch & Merryweather Machinery Co., The, Cleveland C232
Multi-Hydromatic Welding & Mfg. Co., Detroit G224

N

National Cylinder Gas Co., Chicago E119
National Diamond Laboratory, New York F240
National Electric Welding Machines Co., Bay City, Mich. G224
National Industrial Launderers & Cleaners Association, Cleveland B251
National Industrial Publishing Co., Pittsburgh B208
National Pneumatic Co., Rahway, N. J. D249
Nelson Sales Corp., Lorain, O. E224
New England Auto Products Corp., Pottstown, Pa. E245
New Equipment Digest, Cleveland A105
North American Philips Co. Inc., New York F138

O

Oakite Products Inc., New York H159
Ohio Carbon Co., The, Cleveland E209
Ohio Crankshaft Co., The, Cleveland F179
Olsen Testing Machine Co., Tinius, Philadelphia F109
O'Neil-Irwin Mfg. Co., Minneapolis, Minn. G185
Organic Finishing, New York F-214
Ozalid, Johnson City, N. Y. F204

P

'Pacific Northwest', Tacoma, Wash. G221
Pangborn Corp., Hagerstown, Md. H173
Park Chemical Co., Detroit C143
Penton Publishing Co., The, Cleveland A105
Peters-Dalton Inc., Detroit H232
Phillips Mfg. Co., Chicago D174
Physicists Research Co., Ann Arbor, Mich. A143
Picker X-Ray Corp., New York A159
Pines Engineering Co. Inc., Aurora, Ill. G225
Plant Purchasing Directory, Chicago D210
Potts Co., Horace T., Philadelphia C163
Powder Weld Inc., Brooklyn, N. Y. A209
Power-Pak Floor Machine Co., Cleveland G203
Precision Shapes Inc., Suffern, N. Y. D229
Precision Welder & Machine Co., Cincinnati G224
Product Engineering, New York F169
Progressive Welder Co., Detroit J220
Pulmosan Safety Equipment Corp., Brooklyn, N. Y. C159
Purchasing, Chicago D210
Purdy Co. Inc., A. R., Lyndhurst, N. J. H120
Pyrometer Instrument Co., The, New York B136

R

Radio Corp. of America, Camden, N. J. A114
Radium Chemical Co. Inc., New York A119
Ransburg Co., Harper J., Indianapolis, Ind. A170
Ransohoff Inc., N., Cincinnati C245
Ransome Machinery Co., Dunellen, N. J. A125
Rapids-Standard Co. Inc., The, Grand Rapids, Mich. A155
Raytheon Mfg. Co., Waltham, Mass. D179
Ready-Power Co., The, Detroit G246
Reinhold Publishing Corp., New York C181
Resistance Welder Corp., Detroit G224
Resistance Welder Manufacturers' Assn., Cleveland G224
Revista Industrial, Cleveland A105
Rex Welder & Engineering Co., Kansas City, Mo. G224
Rhode Island Tool Co., Providence, R. I. A211
Richards Co., J. A., Kalamazoo, Mich. H229
Roberts Rubber Co., Weldon, Newark, N. J. E249
Roebling's Sons Co., John A., Trenton, N. J. H155

S

"S" Corrugated Quenched Gap Co., Garfield, N. J. A220
Safety Clothing & Equipment Co., Cleveland E228
Salem Engineering Co., Salem, O. C226
Scherr Co. Inc., George, New York F158
Sciaky Bros. Inc., Chicago E220
Scott & Son Inc., C. U., Rock Island, Ill. B154
Seal-Peel Inc., Detroit F168
Selas Corp. of America, Philadelphia G169
Sentry Co., The, Foxboro, Mass. H141
Sheffield Corp., Dayton, O. H234
Sheldon Machine Co. Inc., Chicago A183
Shell Oil Co. Inc., New York G233
Sherman & Co., New York H172
Smith Corp., A. O., Milwaukee B173
S-M-S Corp., Detroit G224
Solar Aircraft Co., San Diego, Calif. C139
Solvental Chemical Products Inc., Detroit E179
South Bend Lathe Works, South Bend, Ind. D228
Sparkler Mfg. Co., Mundelein, Ill. F228
Specialty Equipment & Machinery Corp., New York D250
Spencer Turbine Co., The, Hartford, Conn. E158
Standard Oil Co. of New Jersey, New York C105
Stearns-Roger Mfg. Co., The, Denver, Colo. H180
Steel, Cleveland A105
Stevens & Co., C. H., South Norwalk, Conn. A215
Stokes Machine Co., F. J., Philadelphia H108
Stoody Co., Whittier, Calif. F161
Stuart Oil Co. Ltd., D. A., Chicago D142
Submergent Alloys Corp., New York G181
Sunbeam-Stewart Industrial Furnace Co., Chicago D163
Sun Oil Co., Philadelphia F105
Sunbeam Corp., Chicago D163
Super Tool Co., Detroit A129
Superior Tube Co., Norristown, Pa. E109
Surface Combustion Corp., Toledo, O. G169
Swift Electric Welder Co., Detroit G224
Synthane Corp., Oaks, Pa. C209

T

Tacoma Chamber of Commerce, Tacoma, Wash. G221
Taylor-Hall Welding Corp., Warren, O. G224
Taylor-Winfield Corp., The, Warren, O. G229
Technical Publishing Co., Cleveland F238
Tempil Corp., New York C108
Thermogen Corp., Cleveland C246
Thomson Electric Welder Co., Lynn, Mass G224
Thomson Industries Inc., Long Island City, N. Y. G237
Tide Water Associated Oil Co., New York B181
Tinnerman Products Inc., Cleveland B163
Torit Mfg. Co., St. Paul, Minn. B176
Trent Tube Mfg. Co., East Troy, Wisc. A177
Turney & Beale, Bayside, N. Y. B108

U

Udylite Corp., The, Detroit G141
Union Steel Products Co., Albion, Mich. H177
Union Stop-Fire Corp., Brooklyn, N. Y. D220
U. S. Hoffman Machinery Corp., New York H225
Universal-Cyclops Steel Corp., Bridgeville, Pa. A169
Upton Electric Furnace Division, Detroit E204

V

Vacu-Blast Co., The, Bulingame, Calif. F226
Vanadium-Alloys Steel Co., Latrobe, Pa. F143
Vapor Blast Mfg. Co., Milwaukee F235
Victor Equipment Co., San Francisco F232

W

Waldes Kohinoor Inc., Long Island City, N. Y. A147
Wall Colmonoy Corp., Detroit G220
War Assets Administration, Washington, D. C. A208
Warren City Mfg. Co. (Federal Machine & Welder Co.) Warren, O. F125
Weiger Weed & Co., Detroit G224
Welding Encyclopedia, New York F169
Welding Engineer, New York F169
Welding Machines Mfg. Co., Detroit G224
Welding Sales & Engineering Co., Detroit G224
Weltronic Co., Detroit F224
Westinghouse Electric Corp., Pittsburgh C125
Wheelco Instruments Co., Chicago F108
Wilmotte, Inc., Raymond M., New York F-251
Wilson Mechanical Instrument Co. Inc., New York B159
Wood Products Corp., J. R., Brooklyn, N. Y. G245
Wright-Hibbard Industrial Truck Co., Phelps, N. Y. B-125

Y

Yale & Towne Mfg. Co., The, Philadelphia D147

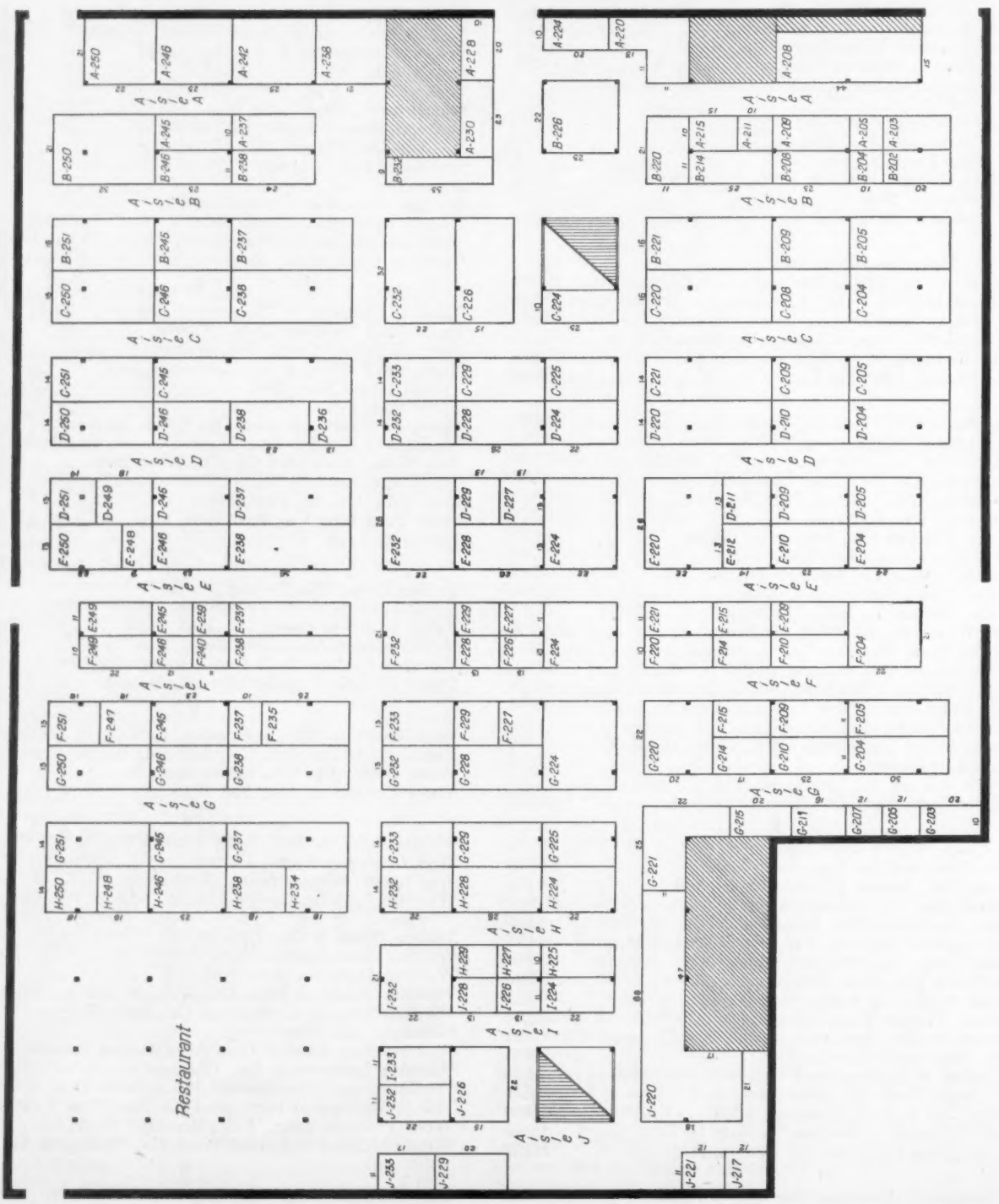
FLOOR PLAN...

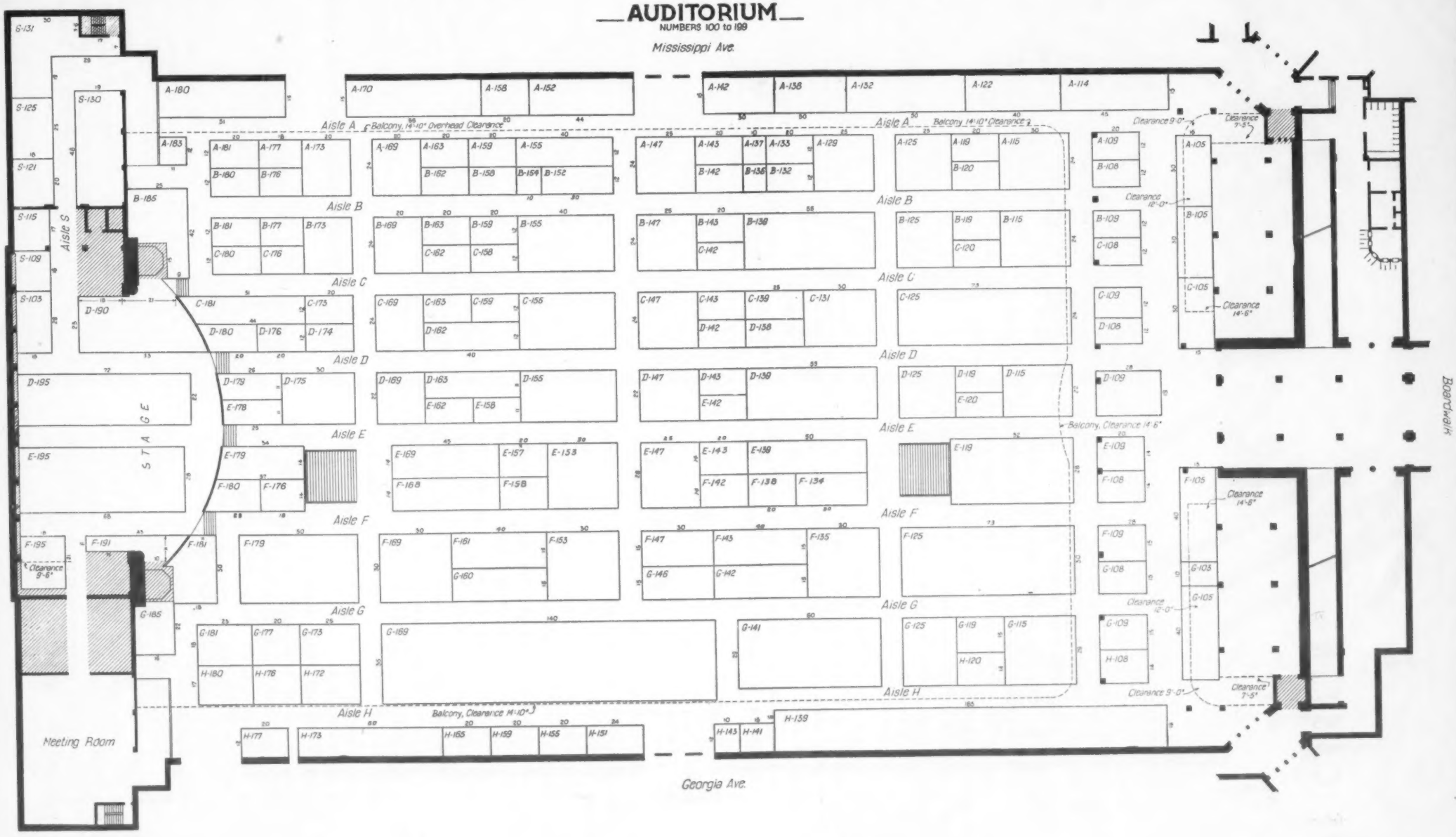
National Metal Exposition

HOURS—NATIONAL METAL EXPOSITION

Atlantic City Municipal Auditorium

Monday, Nov. 18 . . . 12 noon to 10:30 p.m.
Tuesday, Nov. 19 . . . 12 noon to 10:30 p.m.
Wednesday, Nov. 20 . 12 noon to 10:30 p.m.
Thursday, Nov. 21 . . 10:00 a.m. to 6:00 p.m.
Friday, Nov. 22 . . . . 10:00 a.m. to 6:00 p.m.




AUDITORIUM
NUMBERS 100 to 199
Mississippi Ave.
Georgia Ave.
Pacific Ave.
Boardwalk
STAGE
Meeting Room
Aisle A
Aisle B
Aisle C
Aisle D
Aisle E
Aisle F
Aisle G
Aisle H
Balcony, 14'-10" Overhead Clearance
Balcony 14'-10" Clearance
Balcony, Clearance 14'-6"
Balcony, Clearance 14'-10"
Clearance 9'-0"
Clearance 7'-5"
Clearance 12'-0"
Clearance 14'-6"
Clearance 9'-6"

DIE CASTING *Magnesium*

PRODUCTION of castings by forcing molten magnesium alloys at high pressure into steel dies has opened the way for the manufacture of almost completely finished parts directly from the molten metal in a single operation. The absolute necessity for minimum weight in aircraft during the war greatly stimulated the application of magnesium die castings in this industry, where they were used for numerous small brackets and parts of the control system, in engine construction, and in parts for aircraft instruments such as the automatic pilot.

Alloys: At the present time by far the largest proportion of die castings are being produced from a magnesium alloy containing 9 per cent aluminum, 0.6 per cent zinc, 0.2 per cent manganese. This composition combines good casting characteristics with adequate mechanical properties and corrosion resistance. Typical mechanical properties obtained on standard ASTM die cast test bars are:

Tensile strength, psi	33,000
Yield strength, psi	21,000
Elongation in 2 in., per cent	3.0
Brinell hardness	60.0
Izod impact, ft. lb	1.5

A second alloy used to a limited extent (ASTM AS100) has a composition of 10 per cent aluminum, 0.13 per cent manganese, 0.5 per cent silicon, and the remainder magnesium. This alloy is said to have somewhat higher fluidity, but shows lower corrosion resistance and somewhat lower elongation and impact properties. Recently, a grade of alloy No. AZ91 of controlled high purity and designed as ASTM No. AZ91X was made available for casting. This alloy has use where maximum corrosion resistance is required. Since die casting pot and casting temperatures are usually low, these pure alloys can be handled conventionally. The addition of a very small amount, approximately 0.001 per cent, of beryllium has been made in some die casting plants in order to retard oxidation in the molten state.

Die Casting Machines: High pressure, cold chamber type machines are most satisfactory, with pressures as high as 50,000 psi being used. Probably the average die casting pressure range for magnesium alloys would be around 4000 to 15,000 psi. Low pressure machines, such as the gooseneck type operating at 400 to 600 psi, are not generally recommended. For general purposes, machines with die locking pressures of 400 to 500 tons are desirable, due to the high injection pressures commonly used. Die clamping capacities would have to be considered in relation to the injection pressures in order that there is sufficient locking pressure to keep the dies closed on the castings with the largest projected area. It is very important that the machine have adequate strength and rigidity. A diagrammatic sketch of a typical cold chamber machine is shown in Fig. 14.

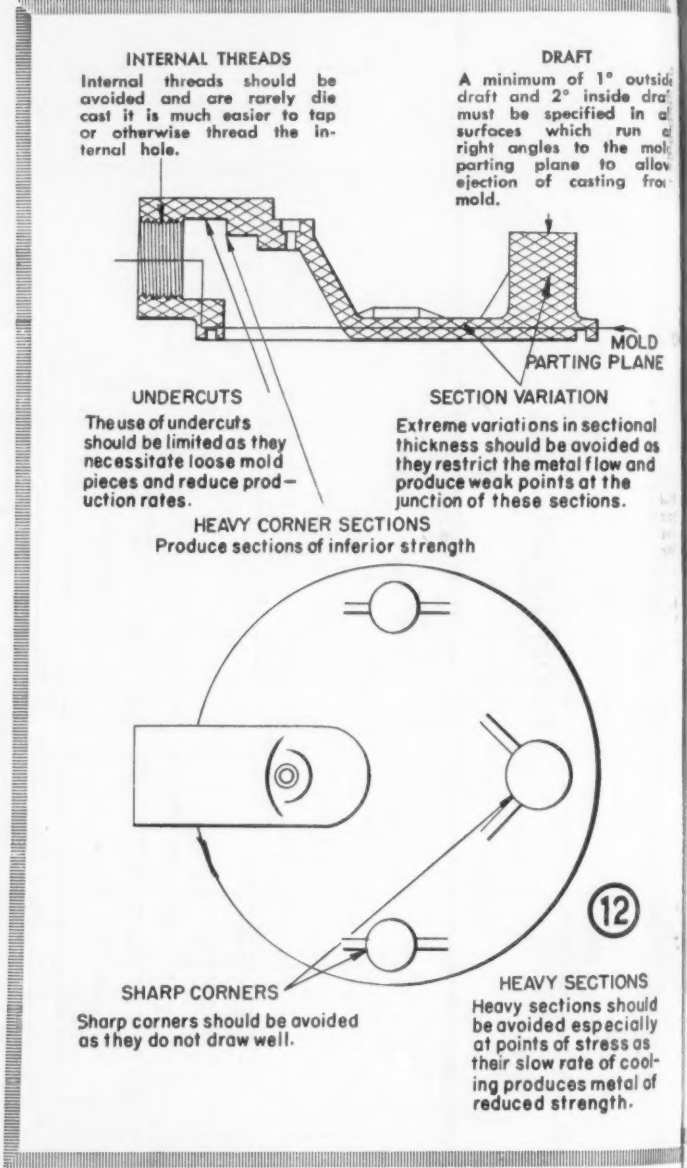
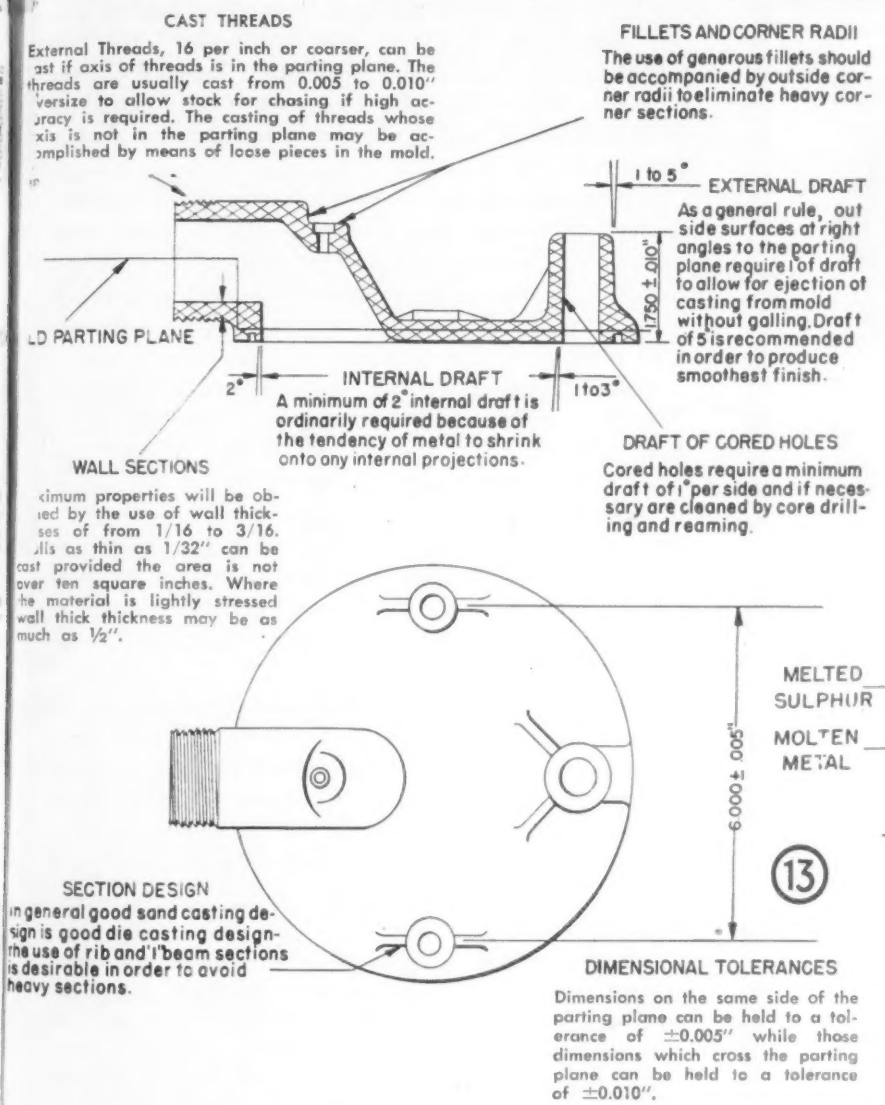

INTERNAL THREADS
Internal threads should be avoided and are rarely die cast it is much easier to tap or otherwise thread the internal hole.
DRAFT
A minimum of 1° outside draft and 2° inside draft must be specified in all surfaces which run at right angles to the mold parting plane to allow ejection of casting from mold.
MOLD PARTING PLANE
UNDERCUTS
The use of undercuts should be limited as they necessitate loose mold pieces and reduce production rates.
SECTION VARIATION
Extreme variations in sectional thickness should be avoided as they restrict the metal flow and produce weak points at the junction of these sections.
HEAVY CORNER SECTIONS
Produce sections of inferior strength
12
SHARP CORNERS
Sharp corners should be avoided as they do not draw well.
HEAVY SECTIONS
Heavy sections should be avoided especially at points of stress as their slow rate of cooling produces metal of reduced strength.

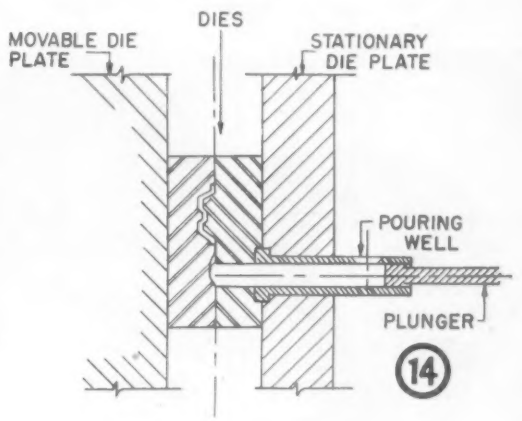
Fig. 15 shows a diagrammatic sketch of the type melting pot in most common use for the die casting of magnesium alloys. The molten metal is protected against oxidation by means of SO_2 fumes generated in the double-walled dome shown in the figure. The space between the walls contains a layer of sulphur, and the heat from the pot causes the sulphur to melt and sulphur vapor to issue through holes or slots surrounding the ladle opening in the sides of the cover.

BY ALLEN G. GRAY
Consulting Editor, STEEL

Alloys

Alloying, melting, die casting techniques and design features are described in this installment of the author's current series of articles


CAST THREADS
External Threads, 16 per inch or coarser, can be cast if axis of threads is in the parting plane. The threads are usually cast from 0.005 to 0.010" oversize to allow stock for chasing if high accuracy is required. The casting of threads whose axis is not in the parting plane may be accomplished by means of loose pieces in the mold.
FILLETS AND CORNER RADII
The use of generous fillets should be accompanied by outside corner radii to eliminate heavy corner sections.
1 to 5°
EXTERNAL DRAFT
As a general rule, outside surfaces at right angles to the parting plane require 1° of draft to allow for ejection of casting from mold without galling. Draft of 5° is recommended in order to produce smoothest finish.
1.750 ± .010"
LD PARTING PLANE
2°
INTERNAL DRAFT
A minimum of 2° internal draft is ordinarily required because of the tendency of metal to shrink onto any internal projections.
1 to 3°
WALL SECTIONS
ximum properties will be obied by the use of wall thickses of from 1/16 to 3/16. alls as thin as 1/32" can be cast provided the area is not over ten square inches. Where the material is lightly stressed wall thick thickness may be as much as ½".
DRAFT OF CORED HOLES
Cored holes require a minimum draft of 1° per side and if necessary are cleaned by core drilling and reaming.
6.000 ± .005"
13
SECTION DESIGN
In general good sand casting design is good die casting design—the use of rib and I beam sections is desirable in order to avoid heavy sections.
DIMENSIONAL TOLERANCES
Dimensions on the same side of the parting plane can be held to a tolerance of ±0.005" while those dimensions which cross the parting plane can be held to a tolerance of ±0.010".



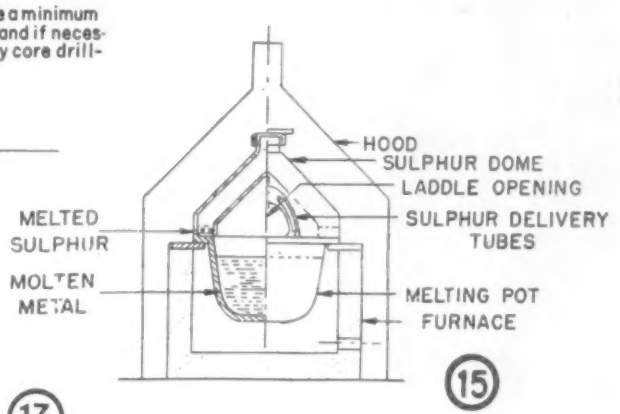


Fig. 12—Incorrect die casting design

Fig. 13—Correct die casting design

Fig. 14—Typical cold chamber die casting machine

Fig. 15—Melting and protecting system for die casting magnesium alloys

The sulphur vapors burn on contact with the air, thus providing SO_2, which effectively inhibits active oxidation of the molten magnesium alloy at the operating temperatures between 1100° F and 1300° F. The pots are generally of 450 lb magnesium capacity and are made of plain carbon cast steel. They are normally placed in brickwork settings and fired by either oil or gas.

Operating Practice: In the melting and refining of magnesium alloys for die casting, Nos. 220, 310, and 230 fluxes are used. Special protective agents are also utilized during sludging and skimming operations. The sulphur dome melting method is used almost universally for providing metal for die casting operations. The fluxes used in melting of magnesium (such as No. 220) are able to refine the metal, but do not provide surface protection. Since the die casting process requires the introduction of a ladle into the pot many times per minute, the use of a flux that gives surface protection might lead to the inclusion of flux in the metal as a result of the continued agitation. Thus, surface protection is provided by the atmosphere of SO_2 as previously described.

Usual pouring temperature range is 1175 to 1250° F, depending on the design of the casting being made. When it seems necessary to go above 1300° F, in order

to obtain a good casting, efforts should be made to improve gating. In no instance should a pouring temperature of 1300° F be exceeded, since sulphur dioxide will not provide sufficient protection for the metal above this temperature. The lowest casting temperature that will result in sound castings should be used.

Most new jobs are started with the help of x-ray inspection. In many instances this has been found to be the most economical way of developing the proper venting, gating, and casting procedure, even though production control of the job may not require x-ray control. In starting to make castings after an interruption in production, it usually will be necessary to make quite a few castings before the die temperature and conditions become uniform. Until such conditions are stabilized, it is difficult to tell whether a particular casting set-up is adequate for the job.

Dies for casting magnesium alloys may be made from a number of tool steels on the market. For relatively short runs a carbon tool steel is satisfactory. For long die life a tool steel of the 5 per cent chromium—6 per cent tungsten type has been found satisfactory. The dies should be heat treated and drawn to a brinell hardness of about 400 to 450. Drawing temperaure should be 1050 to 1175° F so that the dies will not soften during use.

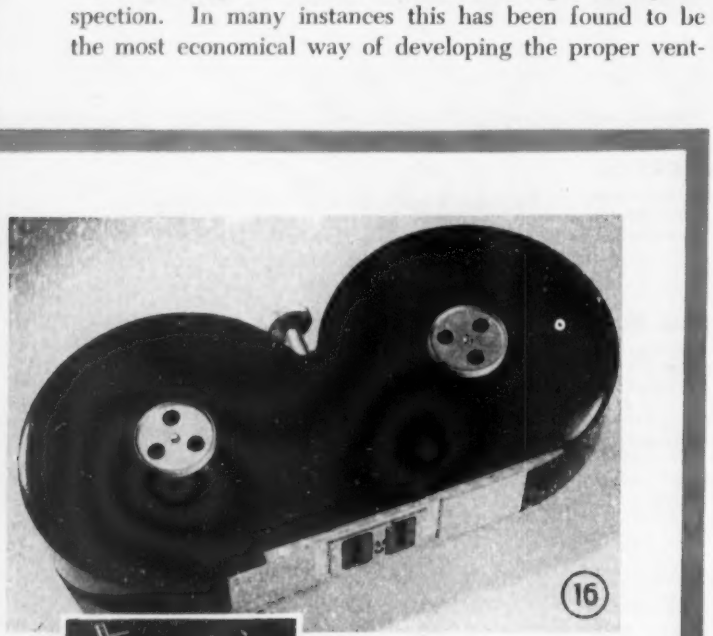
It is common practice to use lubrication on the injection plunger. Graphite type greases similar to those used in the cold chamber casting of other metals are recommended. In general, the amount of lubricant used should be held to the minimum necessary to accomplish the desired result.

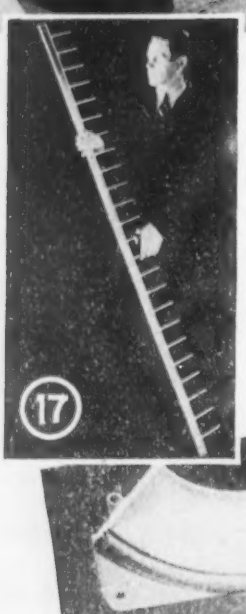
Melting Practice: The ladle is introduced into the pot through a small opening in the cover. The SO_2 generated within the hollow dome is allowed to enter the space just above the metal in such a way as to blanket the molten metal surface and to inoculate the air entering through the ladle opening. The primary meltdown is done by dusting the surface of the pot with No. 220 flux and charging the solid metal into the pot, with careful attention and fluxing to prevent oxidation during this operation.

When the batch is molten, it is stirred thoroughly with the flux to agglomerate the oxide. It is next allowed to stand for about 10 min to prevent settling of the sludge and flux. The melt is then ready for sludging, which consists of removing the sludge with a skimmer perforated with 1/4-in. holes. The skimmer is preheated and put into the metal, scraping the bottom and the sides of the pot.

Sludge Removal: When the skimmer is brought up with the metal and sludge, the molten metal runs through the perforations, leaving only the sludge, which is dumped into a preheated pan. After the sludge is removed from the bottom of the pot any dross or unsettled flux is skimmed from the surface and the metal should now appear clean and shiny. It is advisable to allow about 10 min quiet standing before beginning to dip any metal from the melting pot.

The foregoing procedure is followed in starting up a new pot, but in normal operation it is preferable practice to keep the die casting pot relatively full of metal. This may be accomplished by adding fresh ingot at a rate sufficient to maintain a constant metal level. Still better, it is well to do all of the melting in a separate premelting unit, using No. 230 flux and then transferring molten, refined metal directly to the casting pot by tilting or ladling from the premelter as convenient. If scrapped castings, butts, gates, etc., are charged into the premelter along with ingot, it is preferable to use No. 310 flux for the premelting. The melting of scrap (*Please turn to Page* 212)





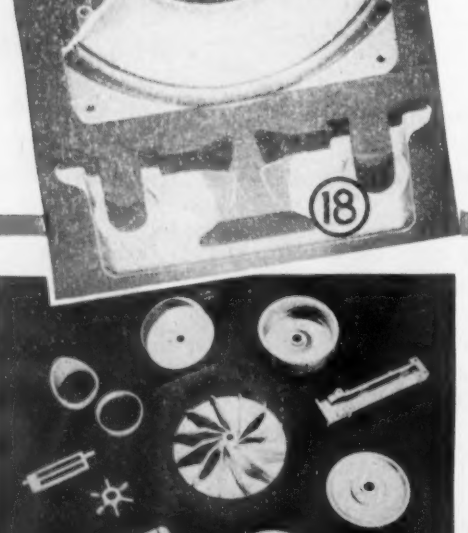


Fig. 16—Die cast magnesium film magazine

Fig. 17 — Magnesium die casting 74 in. long

Fig. 18 — Die cast typewriter cover plates

Fig. 19—Miscellaneous magnesium die castings

Engineering News *at a Glance*

MOVING bill for moving the huge Hughes experimental flying boat overland some 28 miles amounted to $58,000. The trip from Culver City, Calif. to the site of eventual takeoff, was completed in two days, a fleet of motor trucks being used to transport the plane in three sections. The mammoth 220-ft hull section was convoyed by battalions of telephone and power linesmen from 23 utility companies. Total of 2300 utility lines across the route were cut or raised long enough to permit passage. Two years were spent in studying five different methods of moving the ship to salt water before the method employed was used.

TIN oxide is more expensive than other metallic oxide enamel opacifiers, but this might, to some extent, be remedied if a method could be devised of obtaining it direct from the tin concentrates coming from the mining areas, according to "Tin", monthly bulletin of the Tin Producers' Association. The concentrates frequently consist almost entirely of tin oxide, with only a small percentage of impurity. Removal of that part of the impurity which effects the color of enamel adversely is a problem demanding considerable research.

RAIN water in many industrial areas is found to be virtually a diluted solution of sulphuric acid. Every time there is a shower in a typical British town such as Manchester, Glasgow or Swansea, according the British Iron and Steel Research Association, destruction of unprotected iron and steel is at the rate of nearly 3 oz per square foot per year. This is several hundred times as great as at Khartoum, where rust is practically negligible. A polished piece of ordinary steel exposed at Khartoum acts as a fairly good mirror at the end of 5 years, whereas at Sheffield, a similar piece of steel is almost completely destroyed after one day's exposure.

PRICE of short beers may one day be reduced as result of a co-operative agreement recently completed between Reynolds Metals of Kentucky and Benson Mfg. Co., Kansas City, Mo., whereby the former will furnish a continuous supply of aluminum for the manufacture of a newly designed beer barrel. In return, the Kentucky firm will handle sales and distribution of the container. The barrel was developed by Benson in close collaboration with leading breweries. It does not require expensive inside linings, and resists attacks from strong chemical solutions. Also its dimensions cut down on shipping costs, due to ease of stacking, and permits greater numbers to be shipped via freight cars, trucks or ships.

BECAUSE of a shortage of cotton flannel and similar types of material needed in the production of tin plate, Wheeler Roll Co. of Kalamazoo, Mich., in its experiments with substitutes, obtained some remarkable results by applying some of the technology learned in the paper industry in polishing of paper. Remnants and clippings from new cotton materials are processed by shredding, steaming and rolling into sheet form from which pressed cotton disks are made for use on bran rolls, squeeze rolls etc. At present, experiments are being made in oiling machines and other polishing jobs in the steel and metal industries.

WHENEVER the infrared lamp is used for drying or baking, emphasis must be placed on maintaining the gold-plated reflectors in a scrupulously clean condition, according to Oakite Products' publication, "Oakite News Service," New York. Proper thermal efficiency depends almost totally on the reflectors. This is based on a well known principle of optics that reflectivity is proportionate to the degree of smoothness and cleanliness of the reflecting surface. For maximum reflectivity, a clean, mirror-like surface is essential.

DIFFERENCE between bubbling, blistering and pinholing is primarily a matter of degree, depending on the surrounding physical conditions, according to Ralph L. Cook, assistant professor at the University of Illinois, writing in "The Enamelist." If gas bubbles are suspended below the surface of the enamel they are properly classified as bubbling; if they protrude into and above the surface of the enamel they are usually characterized under the general term of blistering; and if the gas bubble pierces the surface, the bubble breaking open and allowing the gas to escape, leaving a depression with rounded edges, it is known as pinholing.

AIR springs that resemble auto tires laid on their sides are currently being tested for railroad car service by Firestone Tire & Rubber Co., in conjunction with Pullman Standard Car Mfg. Co., according to the Akron rubber concern. Following three private tests, they were given their first public tryout recently in a special run over the Chicago South Shore & South Bend tracks between Chicago and Michigan City. On this test, one end of a Pullman car was equipped with air springs and the other end with steel-coil springs. Precision instruments checked the slightest variations in lateral sway and vertical motion caused by track irregularities as the car sped between 35 and 80 mph. Tirelike bellows are inflated in service and connected to an air reservoir. When the spring is depressed, air is forced from the spring into the reservoir. Rebound is then snubbed by a control valve between the bellows and reservoir, minimizing shock to passengers.

MOST promising of the new jet power plants for flight at any high speeds is the ram-jet, the National Advisory Committee for Aeronautics, Washington, revealed recently. Minus moving parts, it consists of a simple tube into which air is rammed and compressed by the forward speed of the plane, and in which fuel is supplied and burned. It promises to be an efficient form of propulsion for a speed of 1500 mph. At that speed its compression ratio, the major factor that determines the overall efficiency of any engine, will be about 8 to 1, about the same as now obtained in the best reciprocating engines. Since this compression ratio is obtained simply through high-speed flight of the ram-jet through the air, it makes a compressor unnecessary, thus putting to use about three-fourths of the gross power developed, and now diverted to driving a compressor in the turbo-jet system. According to NACA, the faster the ram-jet flies, the greater is its efficiency. Only lack of suitable materials for higher temperature operation appears to limit its increasing power output with increasing speed.

WEAK protects the strong at the plant of a mid-western fabricator currently engaged in forming stainless steel water coolers, according to "News and Views," published by Chicago Steel Service Co., Chicago. In this case, paper is used as a protective coat as the highly polished steel goes through various operations. After being squared, sheets are pierced and sent to a press brake for double V forming. A strip of kraft paper protects the polished side from defacement by the die. Care is taken that paper is unwrinkled, and is lying absolutely flat. Because impression of the die is left in the paper, a new strip is used for each operation. Mill paper is again used to protect sheets until they are ready for the next operation. Next step is radius forming on a press brake. Here kraft paper prevents die from marring finish.

New Coatings and Applications Expand Use of

Porcelain Enamel

Development of high-temperature coatings suitable for industrial melting pots, aircraft and marine exhaust systems and refinement of spraying techniques widen range of applications

STEADY progress in manufacturing techniques and marked improvement of the basic production materials (STEEL, Jan. 21, 1946, p. 98) have resulted in many new applications for products of the porcelain enameling industry.

Originally porcelain enamel was totally decorative, but the present tendency is to pay a great deal of attention to industrial applications. Its present-day value lies in a combination of the two features.

An important advance in the past few years has been the development of high temperature porcelain enamels—withstanding elevated temperatures for long periods, in many cases under high pressures. Among the results of this development was the use of porcelain enamel as a coating for aeronautical and marine exhaust systems. Other successful uses included the exhaust systems for tanks and amphibious ducks used by the Army during the war. Furnace tool flues, and automotive parts are still other articles which can be advantageously coated.

Porcelain enamel coatings for high temperature use have two functions. One is that of preventing corrosion of metal at high temperatures by protecting it from oxidation. The other is that of controlling the heat flow by utilizing either an absorbing or reflecting coating. The absorption or reflection of infrared rays can be greatly controlled by the selection of the proper coating. This, of course, facilitates the utilization of metals for equipment where heat flow is of importance.

Domestic Uses: In 1939 the domestic

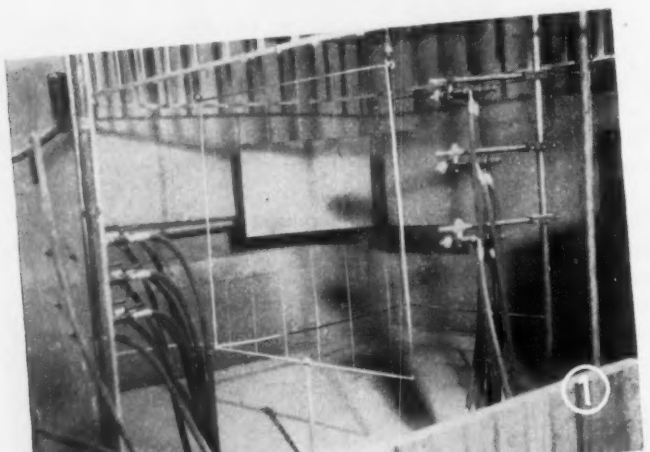


Fig. 1—Booth setup for electrostatic spraying of porcelain enamel. Spray guns at right create a mist which is electrically deposited upon parts going through spray booth

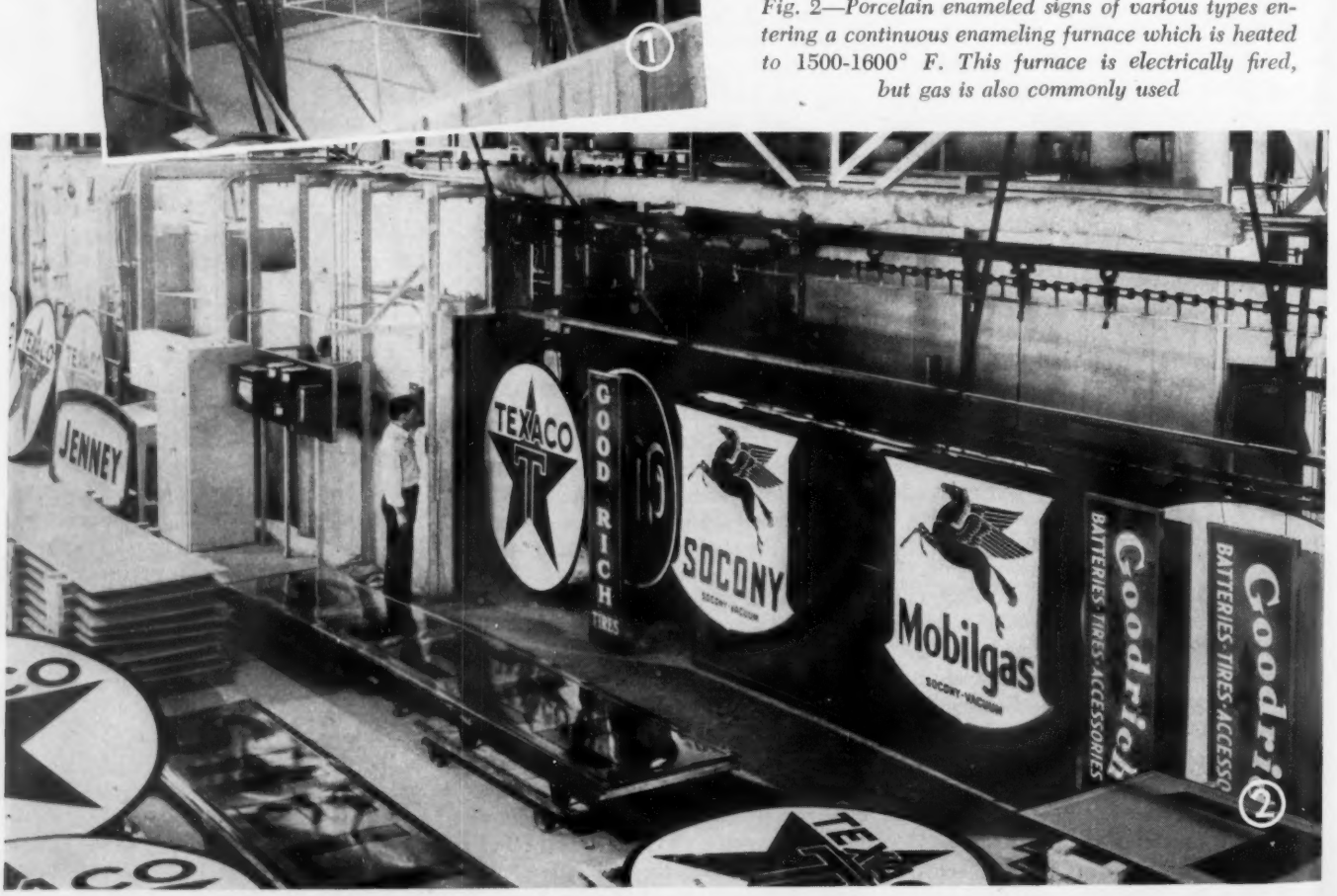


Fig. 2—Porcelain enameled signs of various types entering a continuous enameling furnace which is heated to 1500-1600° F. This furnace is electrically fired, but gas is also commonly used

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There's sweet music—and lower costs—in the sound of tools turning out piece after piece and maintaining production day after day. And now you can get tools that actually cut costs and increase output by using the Carpenter Matched Set Method of tool steel selection. With this method you can "custom-fit" the tool steel to each tool you make. And once you've selected the steel for best results, the Carpenter Matched Tool Steel Manual gives you accurate, easy-to-use heat treating instructions. As a result, you get tools that step up production and stay on the job longer—with less "time out" for regrinds or replacements. The 168-page Manual gives you all the information you need to put the Matched Set Method to work in your plant. Write for your copy today. Just drop us a note on your company letterhead, indicating your title.

YOU CAN GET RESULTS LIKE THIS BY USING THE CARPENTER MATCHED SET METHOD

PRODUCTION UPPED 167%

MACHINE DOWN-TIME MORE THAN HALVED!

The Job:

Producing aluminum toothpaste tubes in volume quantities on a 200-ton press.

The Problem:

The extrusion die required frequent polishing. Each time it had to be removed from the press, 4 hours of productive machine time were lost.

The Results:

The tool maker, using the Matched Set Method, selected Carpenter K-W (Water-Wear) Tool Steel for greater wear resistance. Output per day was increased 167% and press down-time reduced by more than ½!

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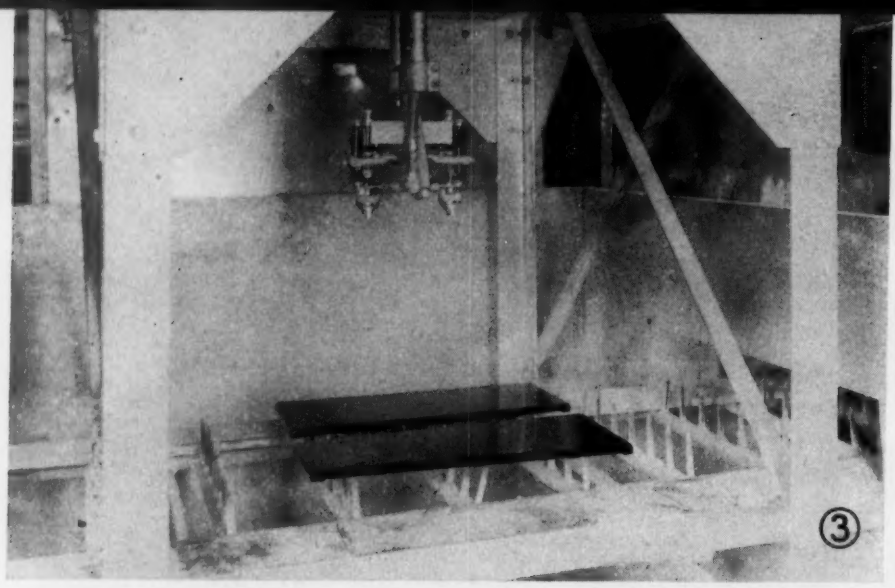


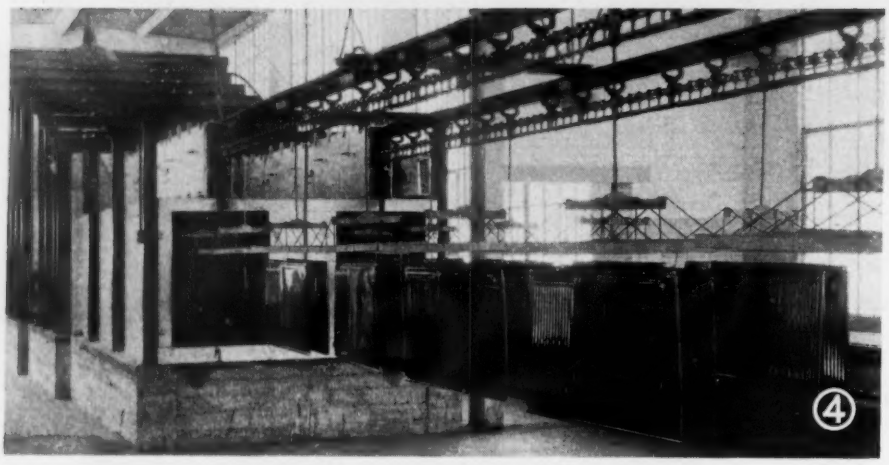


Fig. 3—Pair of reciprocating spray guns spraying flat stove panels which move through booth on pin-type conveyor. Guns move back and forth over work. This method is commonly used on flat parts

Fig. 4—Continuous furnace operation in vitreous enameling large stove panels. Here panels are entering an electrically-fired continuous GE 300 kw, air-sealed, inclined U-type furnace. Scene is in plant of Estate Stove Co., Hamilton, O.

market accounted for 92 per cent of all porcelain enameled products made in this country. This included stoves, refrigerators, plumbing ware, table tops, cooking ware, water heaters, sinks, trays, and washers. Add to the resumption of prewar household appliances the new developments such as home freezers and similar household items, and it becomes apparent that in the domestic and household field, too, porcelain enamel faces a bright future.

For signs of a permanent nature, porcelain enamel has always enjoyed great acceptance. The factors of enduring finish and nonfading colors are the major reasons for this. Especially are porcelain enamel signs a necessity in coastal areas, where they must withstand corrosive salt air and weather conditions. This market will continue at an increased pace. Various types of ingns are shown in Fig. 2 entering an electrically fired furnace. Newest addition to the market will be the aviation requirements for 100,000 airmarkers. The current trend toward airmarking all cities, towns and hamlets will produce a sizeable volume of business for permanent markers of porcelain enamel.

Industrial Uses: Industrial market is opening new horizons for the finish as a result of the wartime search for substitutes and new products. Recent developments have proved the value of porcelain enamel for a wide range of applications from silos to transformer tanks to exhaust and muffler parts.

Due to its great resistance to thermal shock, to extreme temperatures, to corrosive materials, porcelain enamel is proving useful in many industrial applications. The chemical industry has called upon this finish for a host of uses, such as hidden parts in processing equipment. Several automotive and aviation applications have been described above. In fact, during the war the porcelain enameling of submarine exhaust outlets aided in prolonging the length of time they could stay at sea without returning for repairs.

Similarly, in other industrial fields, porcelain enamel has found an important place. The service life of pots for melting and castings light metal alloys, such as aluminum and magnesium, has been increased from four or five days to several weeks by porcelain enameling the pots. In the food field, the smooth, nonporous finish of porcelain enamel has given it a high degree of sanitation. As a result, porcelain enamel is being specified on such equipment as vats and tanks, pumps, food handling units and the like.

An example of the "eye appeal" type of construction is the $2 million Golden Gate Turf Club race track, situated between San Francisco and Oakland, Calif., taken over by the U. S. Navy during the war. Completed in 1940, it never was used for its original purpose, since it was converted to a landing force equipment depot. The rear wall of the 3-tiered grandstand, which forms the front of the club building, is 820 ft long by 40 ft high, and is finished entirely with 18 gage porcelain enamel panels. Apart from a few panels of exceptional size required for structural reasons, the panels are 30 x 60 in. They are matte-finished and are attached to wooden studs with small clips welded to their backs, and sealed with mastic. To cover the 125,000 sq ft area, 125 tons of sheets were used. In addition to the main buildings, porcelain enamel was used in various other locations throughout the club, including the public and private wash rooms, track railings, signs for the 400 betting windows, and similar installations.

Porcelain enamel was chosen because of its ability to resist this moist, corrosive, salt air and frequent fog. Three years of disuse and neglect, before being taken over by the Navy, found the building still in perfect condition. According to Porcelain Enamel Institute, it is probably the largest porcelain enamel construction job ever undertaken.

But, aside from major structural architectural applications, wartime research and development have demonstrated porcelain enamel's value for such uses as chimneys and flues. Many building codes already require this type of flue lining with certain types of fuel. Porcelain enamel chimneys have been proven to have important advantages as follows: No foundation is required; greater draft per foot of chimney height; lower exterior surface temperatures; quick and easy installation; less expensive; and rapid heating and cooling with better draft and higher efficiencies for automatic heating equipment.

One of the great factors in the steady expansion of porcelain enamel possibilities has been the improvement in porce-

(*Please turn to Page* 218)

MESTA

TIN SHEARING LINES

Mesta 42" Tin Shearing Line,
Showing Mesta Patented Flying Shear
and Leveller with Classifying and Piling
Equipment in Background

MESTA MACHINE COMPANY · PITTSBURGH, PA.

Fig. 1—Stud welding open hearth doors

Fig. 2—With this automatic arc stud welder a single operator can weld from 500 to 1000 studs in an 8-hour day

Fig. 3—Railroad passenger car reflooring job

Fig. 4—Diagram of securing stay bolt to inner boiler shell through a hole in the boiler casing

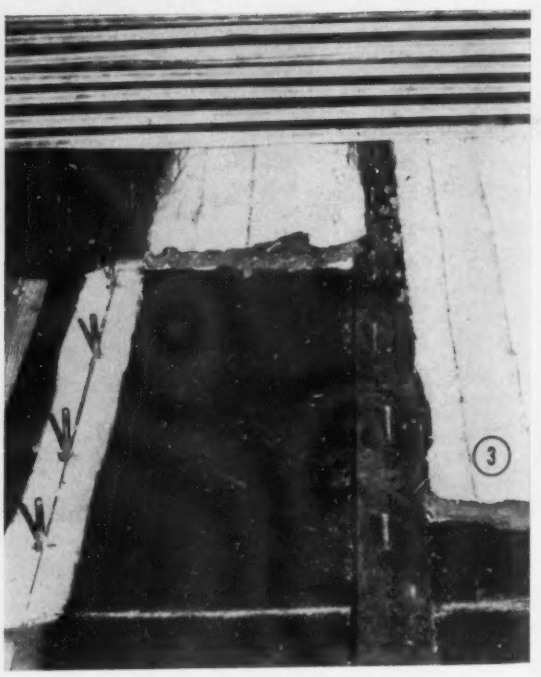
Automatic STUD WELDING

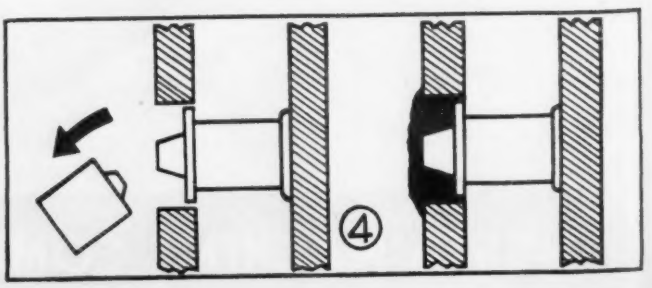
Various types of steel studs used in industrial applications are fused to metal surfaces by means of portable or stationary equipment designed for single operations or for mass production of parts

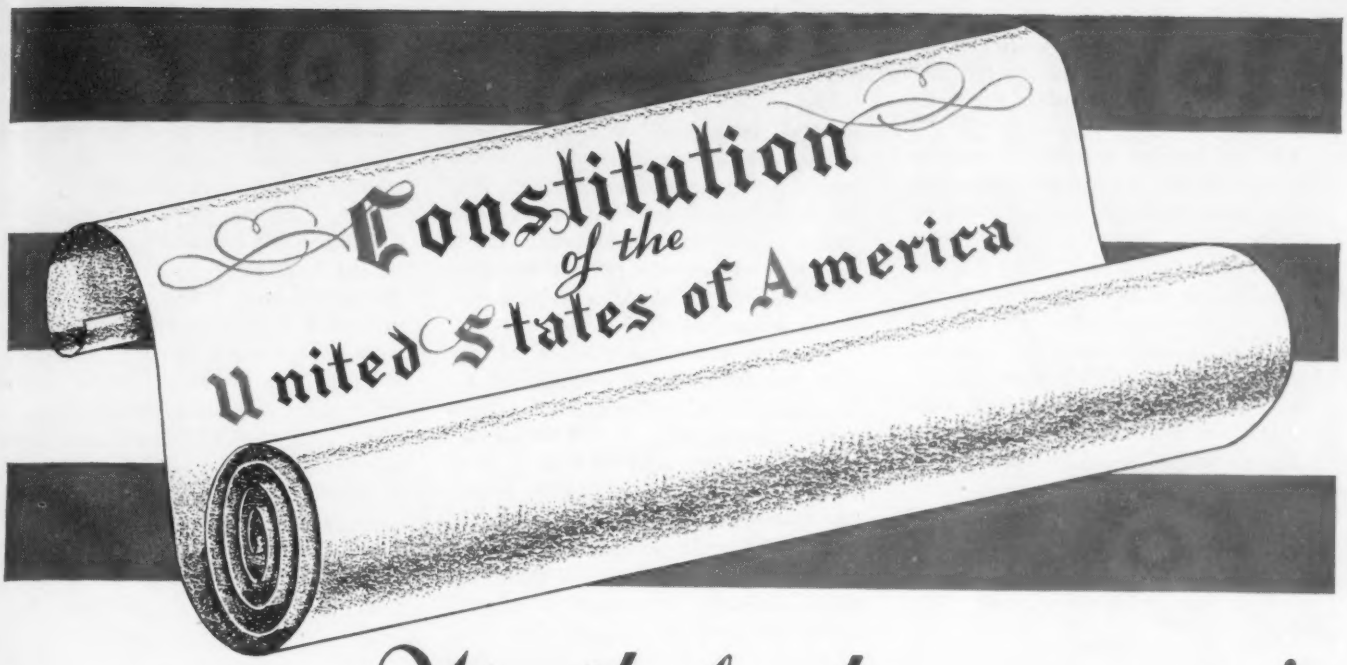
SPLIT second welding of steel studs is finding wide industrial application from boiler fabrication to the manufacture of household flat irons. First used in the wartime shipbuilding program to secure wood decking, the process involves use of a special gun which fuses stud to a steel surface.

While varying in certain minor modifications for specific welding jobs to be discussed later, the basic welding equipment manufactured by Nelson Stud Welding Corp., Lorain, O., and Nelson Specialty Welding Equipment Corp., San Leandro, Calif., consists of the 5-lb hand-operated portable gun, Fig. 2, timer control unit and cables. Current is furnished by one or more standard 400 amp direct-current welding generators.

In operation, the stud is loaded into the gun and stud end placed against surface to which it is to be welded. By simply pressing gun trigger, welding current is turned on and stud is automatically lifted about 1/16-in. by an energized solenoid coil to establish an arc with the weld-

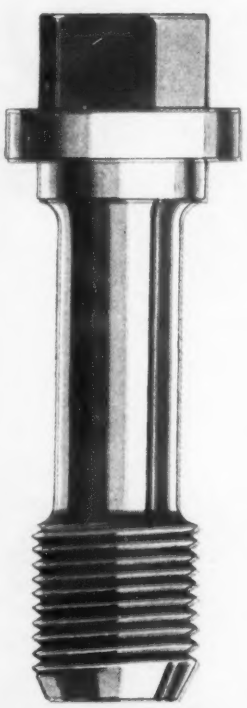






Worth looking up to!

The Constitution of the United States is one of the most important works ever conceived by the mind of man. It has no equal in the documentary annals of governmental society because it recognizes and guarantees the liberty and dignity of man. A public declaration of the principles of the United States, it has guided our Republic during a period of over 150 years, through revolution, rebellion, expansion, panic and world conflict. In a world blighted by incalculable greed and darkened by fear, the United States Constitution is a bright beam of hope.



In the harsh and shouting times of war the Constitution never lacked defenders. When it trembled before determined assault the nation rallied to uphold it. Today, in the lee of an uneasy peace, the Constitution again trembles. Selfish politicians, greedy demagogues and pliant jurists tamper with it, warp its meaning, advance brazen misinterpretations, and craftily seek to undermine this supreme authority of the United States.

The CHANDLER PRODUCTS CORPORATION reaffirms its loyalty to the Constitution. Through the wisdom of our founding fathers and the grace of the Constitution we are a beneficiary of private incentive and free enterprise. And while our success is attributed to the fine quality of our products, our security is backed by the U.S. Constitution. May it forever safeguard American liberty!

CHANDLER PRODUCTS CORP.

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ing surface. Creation and control of the arc between stud and plate is the fundamental operating principle of the welding unit.

The arc burning period is automatically controlled by a pneumatic timing device in the control unit. Arc duration, depending upon diameter of stud being welded, is preset on timer dial calibrated in cycles; no additional setting of the timer is necessary unless diameter of stud to be welded is changed. When arcing period is completed, timer disconnects the welding current which trips the gun, the main spring forcing end of stud into molten metal to complete the weld. Gun is pulled from the stud, chuck reloaded and the welding cycle repeated.

The arc is shielded and the heat concentrated by a porcelain ferrule secured to the stud by female fingers or by the ferrule spring. In addition to controlling the weld (metal deposit), proper positioning of the ferrule reduces the danger of flash and helps to prevent oxidation of the molten metal. After welding, the ferrule is knocked off.

Two production adaptations of the basic gun are shown in Figs. 8 and 11. According to Nelson engineers the single production unit, Fig. 8, will hold tolerances of plus or minus 0.005-in. in location, plus or minus 0.015-in. in height. One operator is said to be able to weld six or eight studs per minute, but when the unit is engineered to perform a particular operation, it is possible to weld 20 to 25 studs per minute. The dual unit will weld 16 studs per minute on a special application. Two guns operating from a single control switch are loaded by two operators, one on each gun. This setup is useful for mass duplication of parts. Fig. 11 illustrates the three-gun unit with magazine feed and automatic ejection in action welding three studs of different diameters to a flat iron sole plate. Using the rotating table, one operator can produce from 25 to 30 welds per minute, completing several plates.

Straight and reduced base studs machined from SAE 1020 steel range in size from 3/16 to 3/4-in. in diameter and in various lengths. Stainless steel (18-8) studs were recently marketed in sizes up to 1/2-in. in diameter. While use of welding flux on smaller sizes is unnecessary, heads of studs 5/16-in. and larger are preloaded with flux, making possible all-position welding with all studs. Variety of studs and securing devices that can be gun-welded are shown in Fig. 6. Included here are straight studs, special bent, grooved, female, reduced base, hooks, eye bolts, cargo batten, lagging, metal lath, rectangular metal lath, stirrup, speed clips.

As mentioned previously, stud welding was used originally in ship yards to secure wood decking, hangers for wire-

Fig. 5—Special vertical screw machine used to cut, chamfer and thread studs

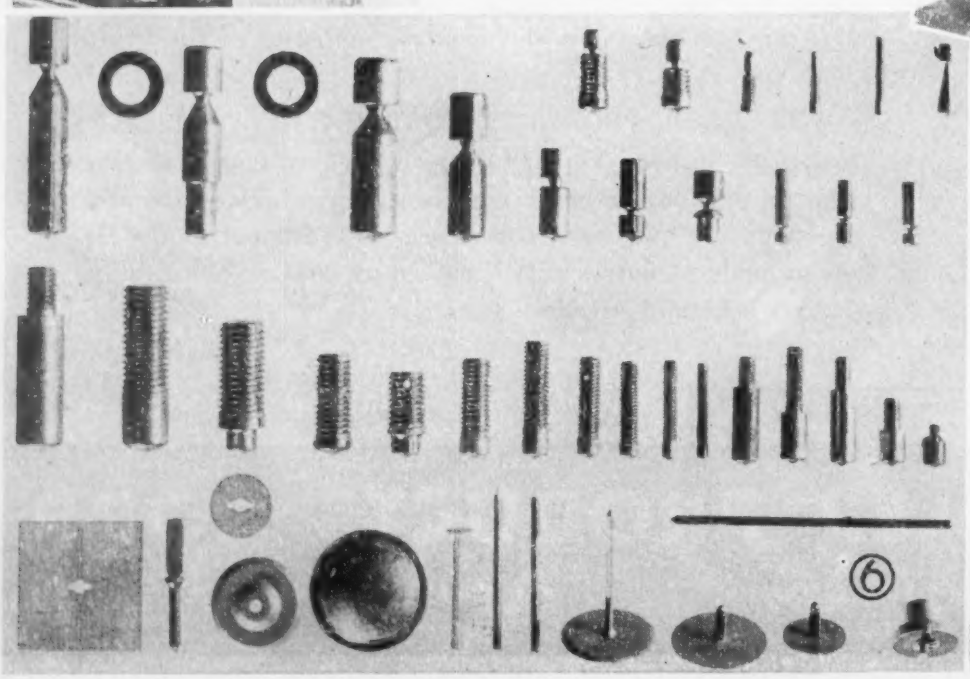


Fig. 6—Some studs and securing devices that can be gun-welded

Fig. 7—Sectional view of stud used in wood decking. A—wooden plug, B—deck planking, C—slotted nut, D—washer, E—stud, F—ferrule, G—weld, H—deck plate

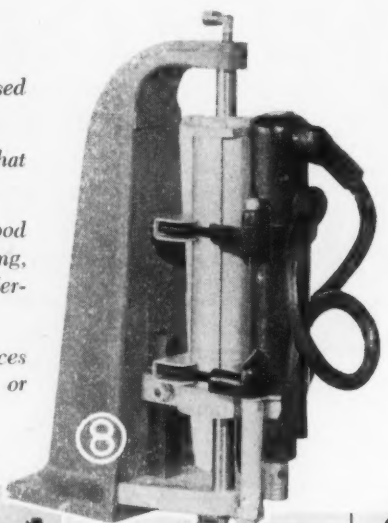
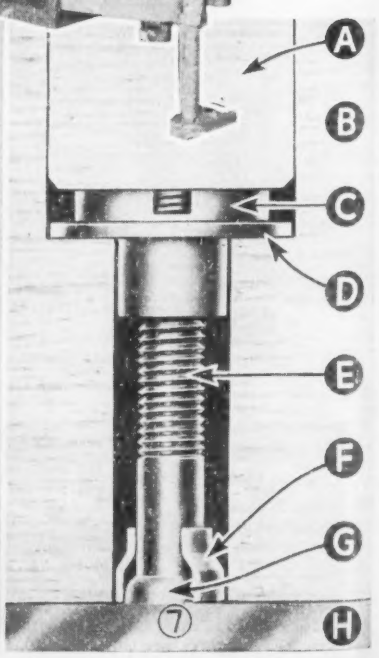
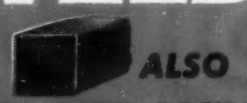


Fig. 8—Single production unit holds tolerances to plus or minus 0.005-in. in location, plus or minus 0.015-in. height



Michigan STEEL WELDED TUBING



ALSO

SQUARE • RECTANGULAR
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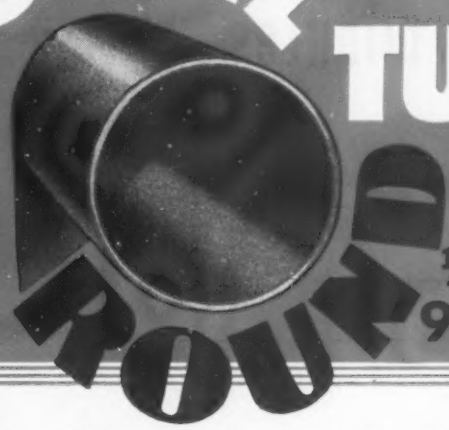
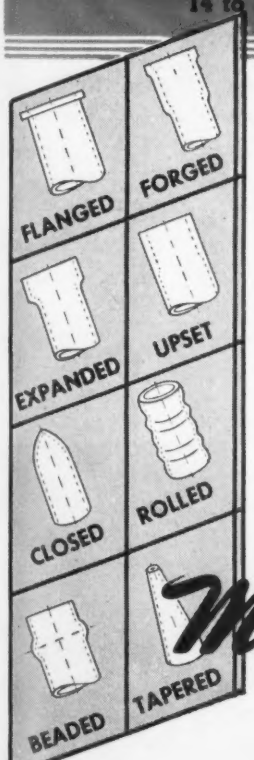
Maximum dimension 2¼"
14 to 20 gauge.



ROUND
¼" to 4" O.D.
9 to 22 gauge



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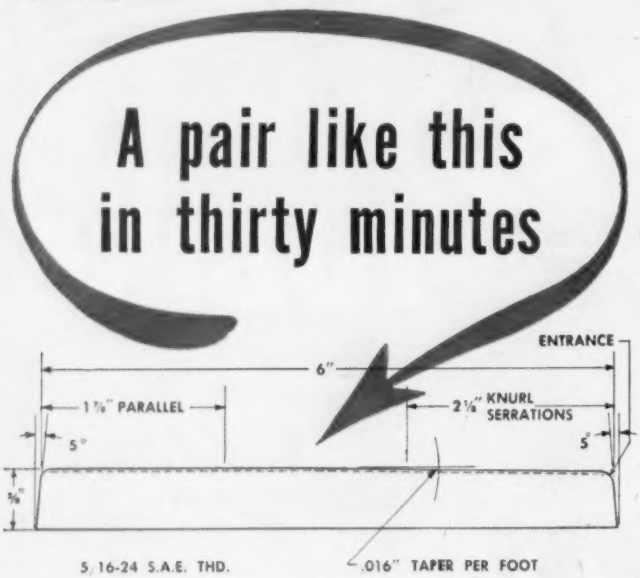
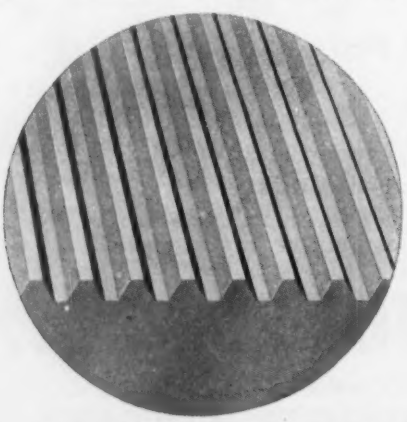
GRIND thread rolling dies?

...*the answer is* **YES!**

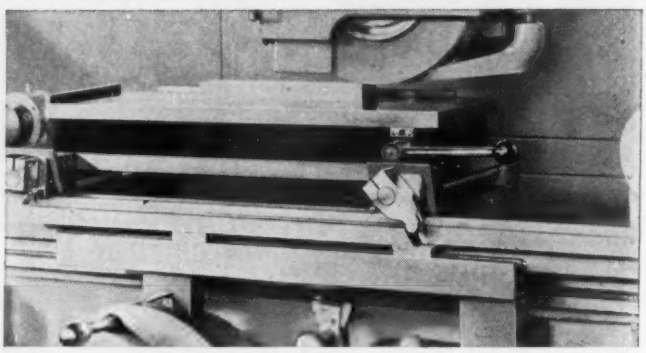
Now—through a new application of THOMPSON TRUFORMING—you can produce accurate duplicate roll thread dies and eliminate subsequent corrective operations formerly required. An example is the roll thread die shown here.



This is the Stationary Die (a perfect mate to the Moving Die not shown). Both were ground on a THOMPSON TRUFORM grinder from heat-treated alloy steel in less than thirty minutes. Note the radii, the precise taper and flat section. This is produced with a single cut—to full depth of thread form without resetting.



Enlarged tooth section shows form of threads and helix angle. By TRUFORMING dies are perfectly matched . . . there is no distortion.



Deformities are eliminated by TRUFORMING because work is finished right in hardened steel. Note the special forming fixture in the photograph, which makes possible completely automatic and highly accurate grinding of the longitudinal contour. These Thompson die grinding features are new with patents applied for.

Longer die life and greater die accuracy, plus ability to regrind dies without drawing, are three great advantages you get with this THOMPSON TRUFORMING application.

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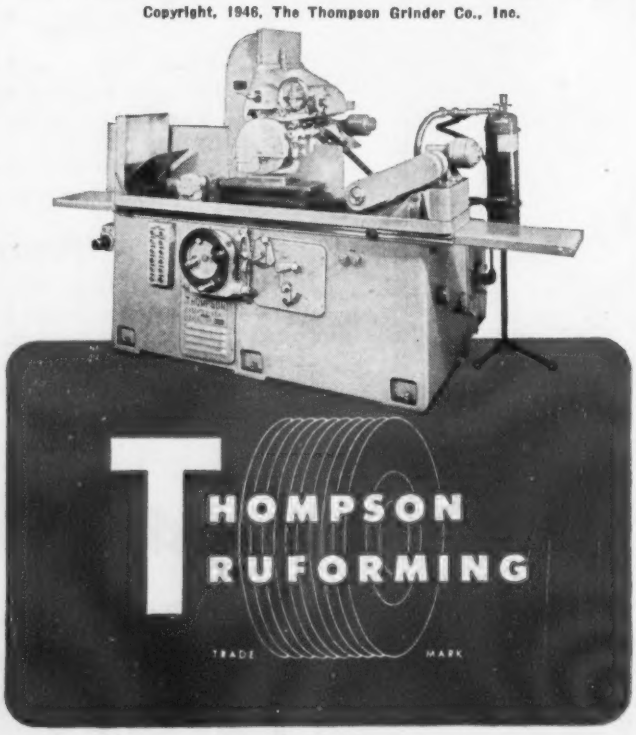


ways, pipe and similar items. It is now utilized in other fields including railroad car construction, industrial equipment manufacture and maintenance, building construction and automobile production. In some applications one operator with the basic hand gun can weld 500 to 100 studs in an 8-hour day.

In fastening wood decking, Fig. 7, wood planking is fitted into place on metal deck. Holes are drilled and counterbored to the required depth and stud welded through hole to the steel plate.

Next a cadmium plated washer is placed around skirt of special slotted nut and tightened down on decking shoulder. Job is completed by driving a wooden plug into the counterbored hole.

On the railroad passenger car reflooring job, Fig. 3, studs are welded on top of car sills and floor beams. Drilled furring strips and subfloor sections are slipped over studs, nuts fastened and composition flooring laid. No undercar equipment is required. Welding time: 1/2-sec per stud.

Complete fusion of stud to metal water-cooled open hearth doors, Fig. 1, is said to increase door life as much as 150 heats without restudding. Refractory material is packed between welded studs.

Soft insulation material is secured to steel plate as shown in Fig. 9. Weld is made by pushing pin, varying in length from 3/4 to 6 in. through insulation to make contact with steel base. Arc burns for approximately 1/10-sec in this operation. Method of securing sheet metal over insulation is illustrated in Fig. 8. Female studs are welded to plate, insulation impaled and sheet metal placed on top. Studs are located by tapping metal sheet with hammer. A small hole is then punched in the sheet and a drive screw driven into the female stud. A similar process fixes cement-asbestos board.

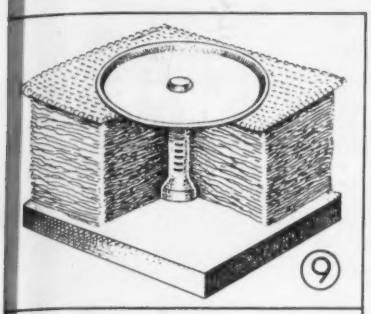
In new method for securing expanded metal lath, wire, etc., using a special chuck, rectangular studs are welded to metal and lath hooked onto them. Studs are then knocked over so that they grip lath.

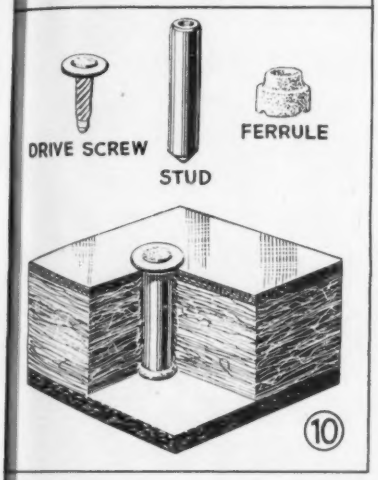
Stud welding corrugated asbestos roofing and siding is performed by drilling a 9/16-in. hole through asbestos, welding threaded stud to steel framework, applying zinc nut with soft lead washer and tightening down. The washer expands with tightening to make a weathertight seal.

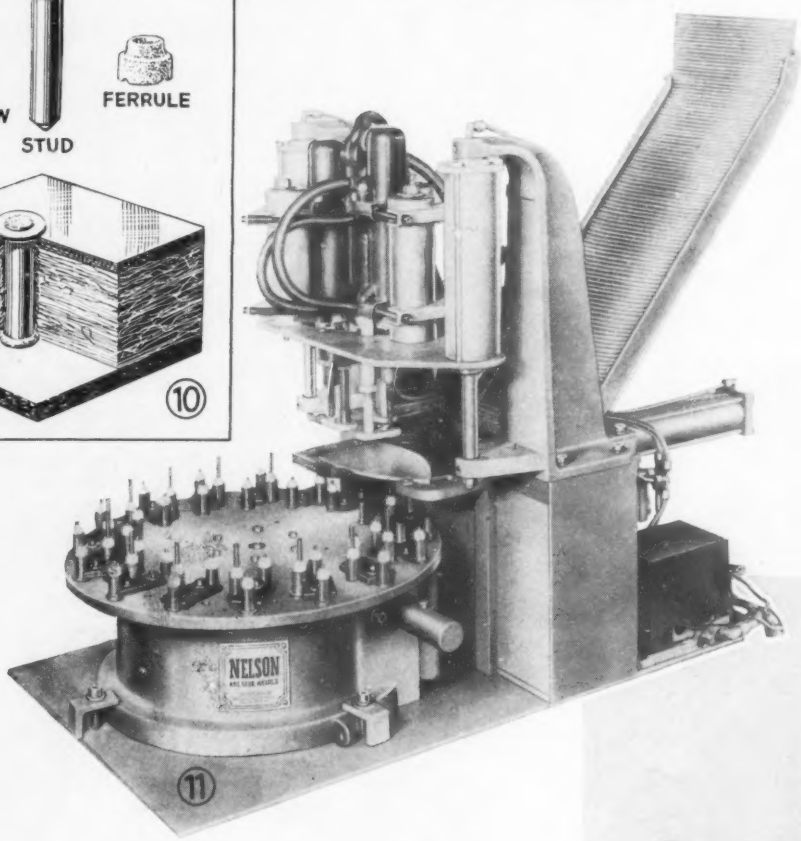
Boiler fabrication may involve welding stay bolt studs to the inner boiler shell through a hole in the casing, as shown in Fig. 4. The stud projection is broken off at groove, back-up washer installed and sheet hole hand welded. Regular boiler tube studding is welded at the rate of 200 studs per hour.

Studs are machined and flux filled at

(*Please turn to Page* 234)







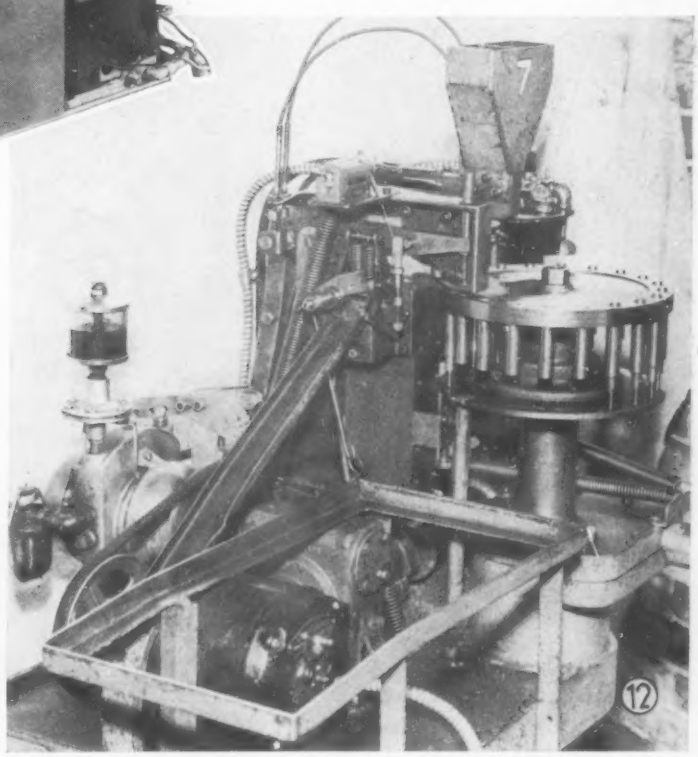
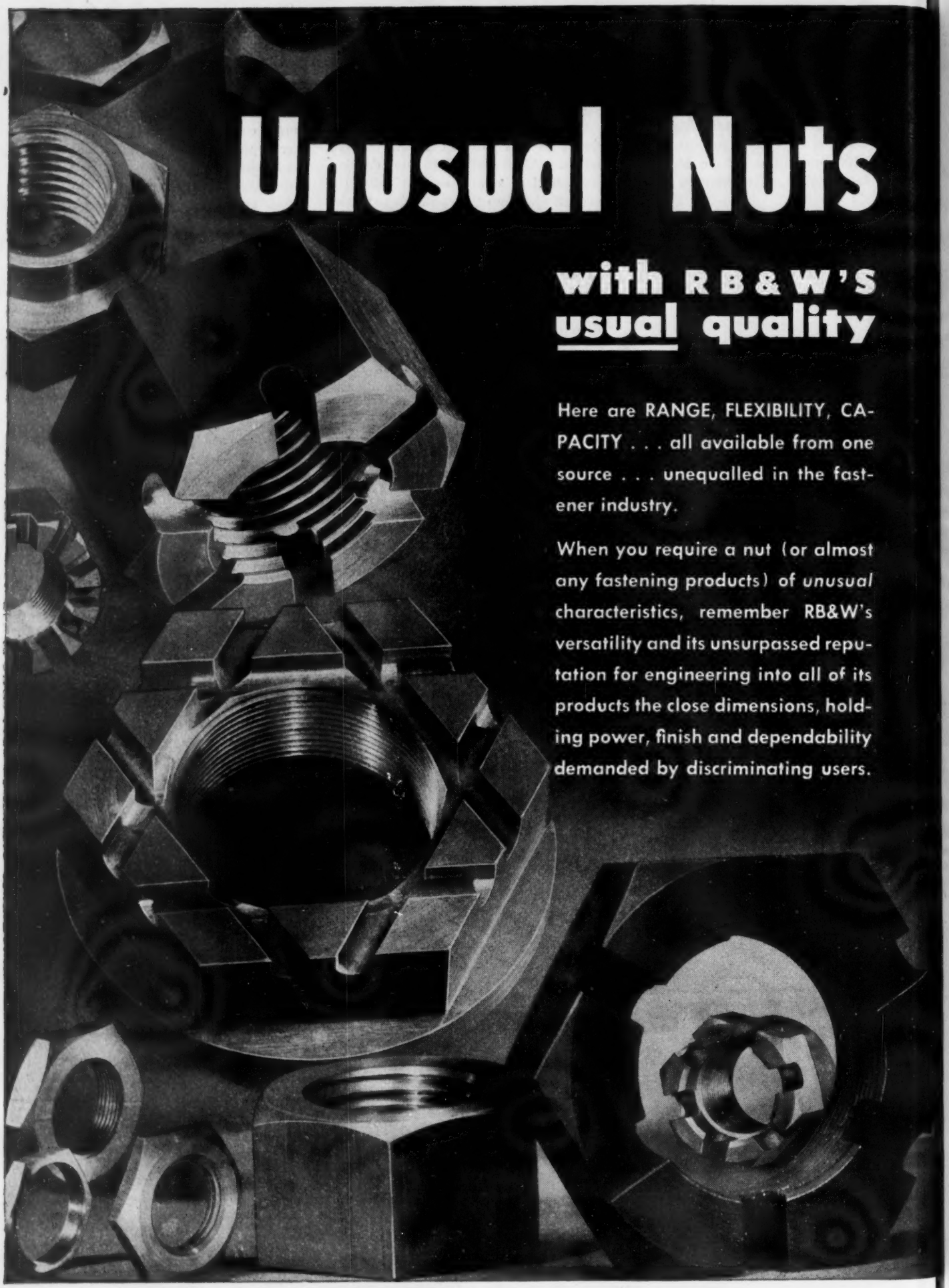


Fig. 9—Cutaway view of insulation pin welded to steel plate through soft insulation material

Fig. 10—Diagram showing method of securing sheet metal over insulation

Fig. 11—Three-gun production unit with magazine feed welds three studs of different diameters to an iron sole plate. Production is 25 to 30 welds per minute

Fig. 12—Heads of studs 5/16-in. and larger are filled with flux on this automatic machine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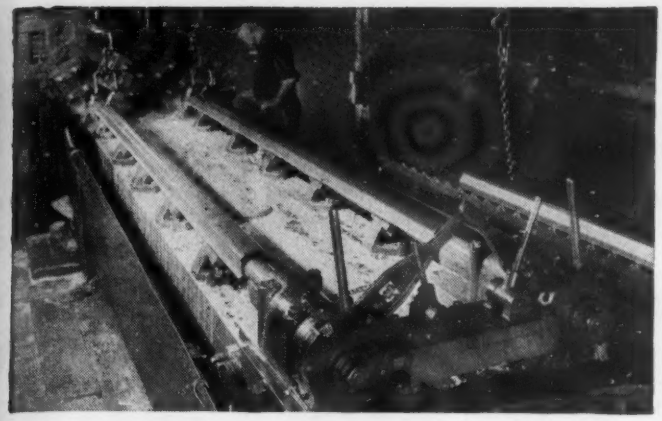
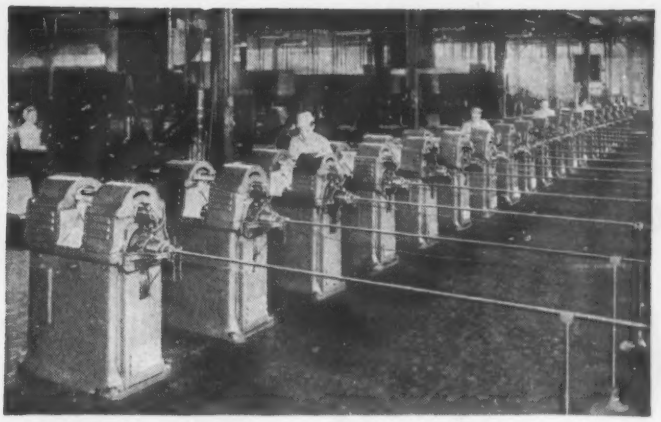
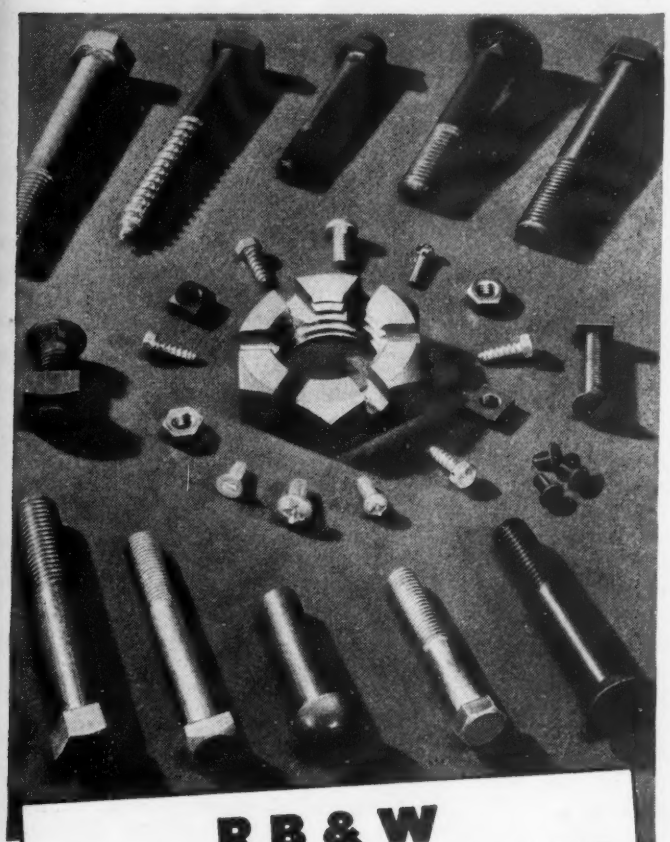


RB&W HAS EQUIPMENT for handling nuts of almost any size. This immense machine planes hot-forged round bars down to hexagonal shape for fabrication of some of the largest nuts.



A GLIMPSE OF ONE SECTION of the Screw Machine Department at RB&W's Coraopolis plant. Here are made nuts of extra thickness or special material — nuts to specifications which make efficient cold-punching impractical.



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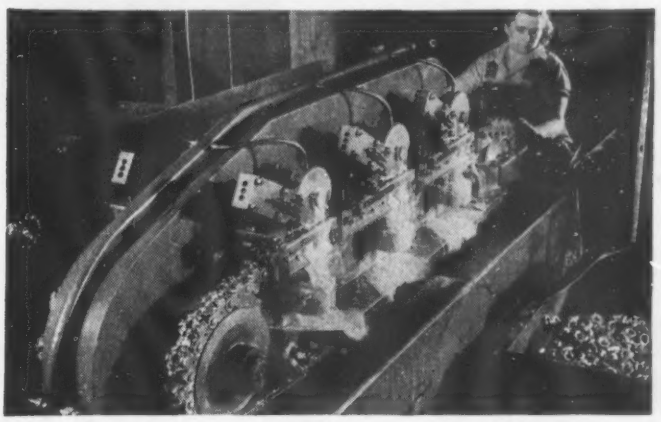

THIS SLOTTER ILLUSTRATES the efficiency of RB&W's secondary equipment. Many new machines round out facilities for producing nuts for a wide variety of applications — to highest standards of quality.

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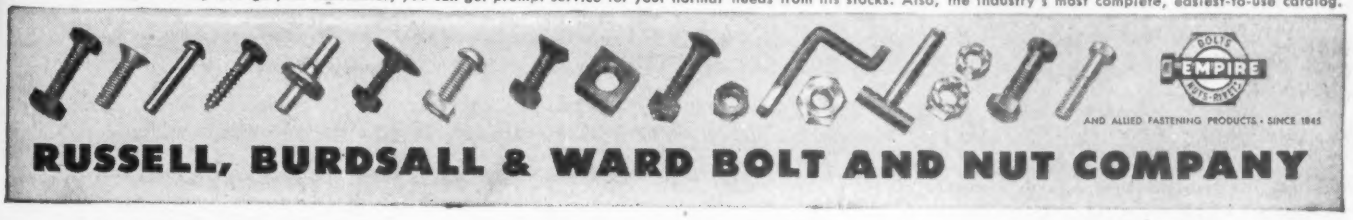

RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY

"Portable" INDUCTION HEATING

New method expands applications for induction heating since it permits bringing heat to bulky work and short-run items which cannot be handled readily by standard inductor work coils. Wider range of work also made possible through development of 30,000 cycle and 3 megacycle machines. Variable ratio transformer reduces machine changeover time when switching from job to job

ADDITIONAL uses for induction heating in the metalworking industries undoubtedly will result from the development of a portable inductor or "gun" for carrying heat to work which cannot be conveniently handled with the conventional type inductor coils usually employed with induction heating machines. The "gun" may be used with standard machines now in use.

Development work on the new "gun" already has been completed by the Tocco Division of The Ohio Crankshaft Co., Cleveland, and it will be shown for the first time at the National Metal Congress in Atlantic City next week. At the same show, Tocco will exhibit a new 30,000 cycle motor-generator machine, as well as a 3 megacycle induction heating unit and a variable ratio transformer designed to increase the versatility of present motor-generator induction heating units.

Ohio Crankshaft entered the heat treating field commercially in 1936 and introduced a packaged, 10,000 cycle motor-generator machine in 1939. More recently, the company brought out a 450,000 cycle vacuum tube oscillator set.

However, for several years prior to their entrance into the field of selling heat treating equipment The Ohio Crankshaft Company had been conducting research and development work in the heat treating field. In 1935, W. C. Dunn, president, and F. S. Denneen, secretary-treasurer of the company, developed an induction heating unit satisfactory for heat treating the crankshafts and camshafts produced in the company's own plants. The following year one of these crankshaft units was sold to the International Harvester Co. Rapidly it became apparent that induction heating could be applied to hardening not only crankshafts but also all sizes and shapes of metal parts. By 1939 a compact, packaged unit was developed to fill the

Fig. 1—Close-up of portable inductor shown in Fig. 2

Fig. 2—Using portable inductor connected by long leads to 10,000 cycle machine, operator shows how steel parts may be silver soldered

Fig. 3—Operator here is changing tap connections on variable ratio transformer which has range of possible ratios from 5:1 to 17:1, making machine match efficiently all types and sizes of induction heating coils

For Strength with less Dead Weight

J&L OTISCOLOY

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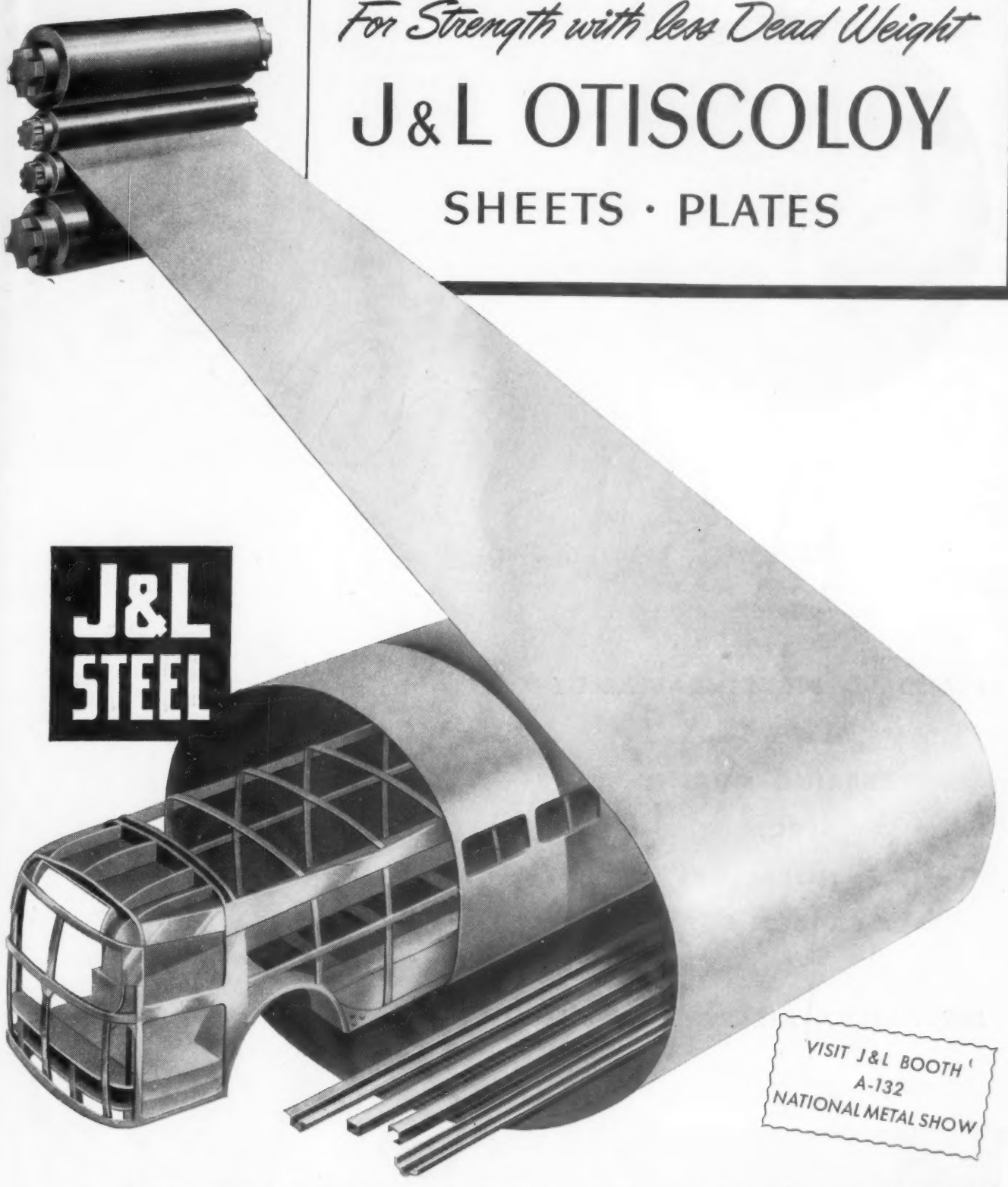

Many manufacturers are using J&L Otiscoloy sheets and plates to reduce dead weight, increase pay load in buses, trucks, and other equipment. Its high strength and formability make it particularly suitable for use in producing formed structural members to support roofs and side panels. Operators find that its resistance to abrasion and corrosion is a big advantage in reducing maintenance costs and down-time. Ask the nearest J&L District Office for further information.

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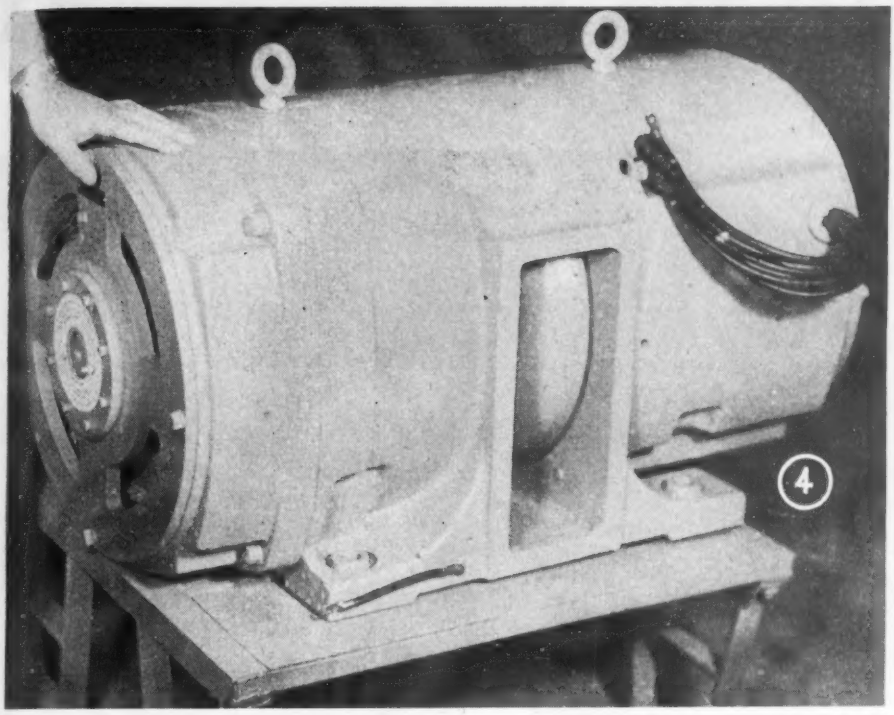


Fig. 4 — Motor generator set with 30,000 cycle rating extends range of this type of induction heating to smaller parts

Fig. 5—Thin section parts can be heated efficiently with this 3 megacycle electronic unit

need. Within a year these machines were being used not only for hardening but also for heating for forging, soldering, brazing, annealing and shrink-fitting metal parts.

Portable Inductor: Meeting the demand for a more versatile unit which could be used in handling bulky, odd-shaped work and short production runs, the company designed the Tocco heat gun. It is, in effect, a portable inductor which may be taken to the part rather than the part to the inductor. This portability feature has been used with light flexible leads up to 20 ft, and there is no apparent reason why it cannot be used with considerably longer leads.

Long current leads present a considerable problem in designing induction heating equipment. With the conventional single turn inductor, the necessary current in the inductor is high in order to produce the required heating effect. Such a high current would be difficult to transmit efficiently in a cable of reasonable size. The portable "gun" utilizes a multiple turn coil in obtaining the necessary high flux density in the area being heated, with relatively low current supply. This permits utilization of long leads of moderate dimensions to transmit power with high efficiency.

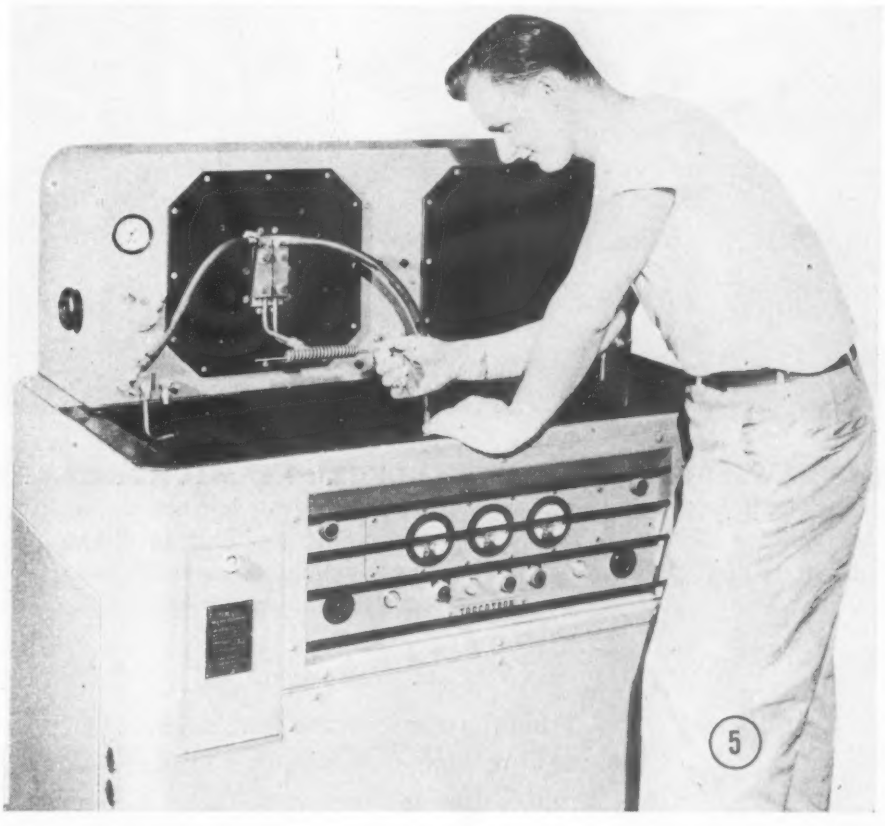
Controlled by a simple trigger switch in the handle, the "gun" operates on current supplied by a standard 10,000 cycle machine. Voltage at the work end is very low—less than 20 v—offering no hazard to the operator who handles the "gun," as shown in Fig. 2, like an electric soldering iron. Any similarity between the "heat gun" Fig. 1, and a soldering iron evaporates, however, upon closer examination of the two heating methods. While the fast induction process induces energy in the piece to be heated, a soldering iron must heat by thermal conduction. No thermal conduction is involved in the operation of the "gun."

Shown in use on a soldering operation, Fig. 2, the "gun" looks like a portable drill, and weighs about as much. The single lead at the operator's right includes two power cables from the machine, two control wires, one water inlet and one outlet. The induction coil in the gun body is surrounded by a water jacket to carry off excess heat. In addition to the hand-operated trigger or manual control, the "gun" can be used with a standard timing device for spot heating on a definite automatically controlled cycle.

In discussing some of the factors contributing to the value of this type of induction heater, the Tocco engineers in charge of the project emphasized the fact that the need for special inductors for different parts may frequently be entirely eliminated. Very small, or very large or bulky parts can often be treated with no change of inductor. Among the possibilities for the gun mentioned were soldering voids on milk containers and other dairy equipment, automoblie bodies, etc.; brazing, confined area heating and annealing and spot hardening.

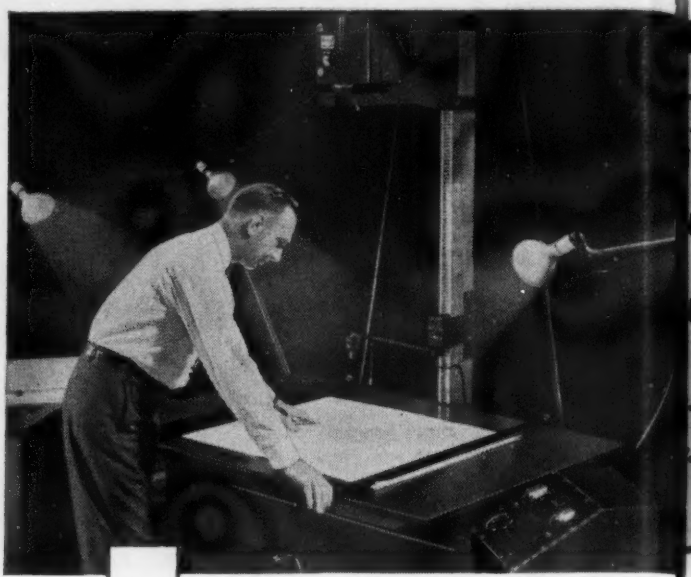
Variable Ratio Transformer: Using a conventional single ratio transformer, shops working on a wide variety of parts find it necessary to change to a different

(*Please turn to Page* 236)



Here are 10 typical examples of

Check them over to see how many can be adapted to your needs... to help you increase quality, decrease costs



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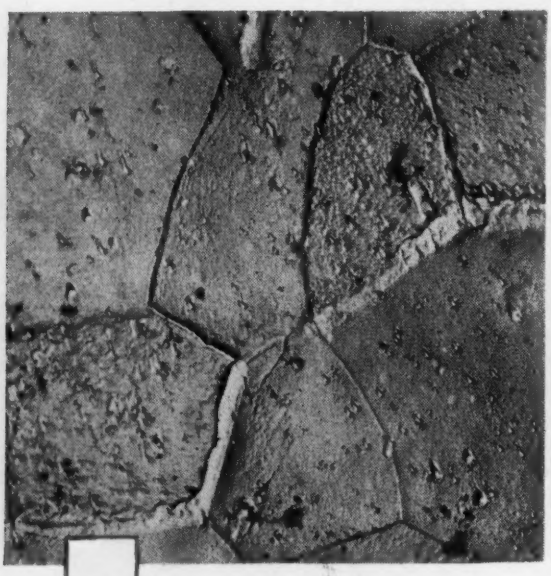
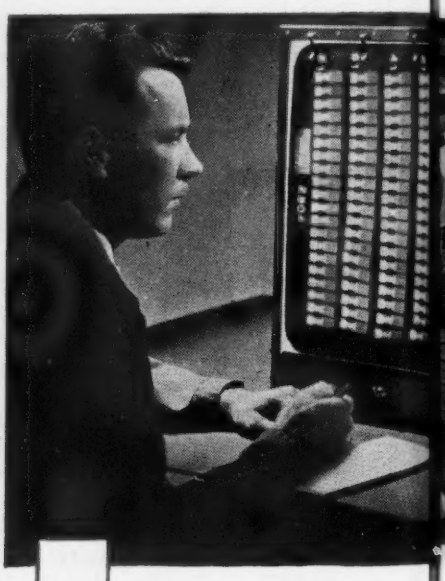


ELECTRON MICROGRAPHY is used to provide a wide variety of important new data by showing surface details at magnifications previously considered impossible.



RADIOGRAPHY is used to verify the practicality of casting technics and designs . . . to provide industry with a rapid, dependable non-destructive method of testing

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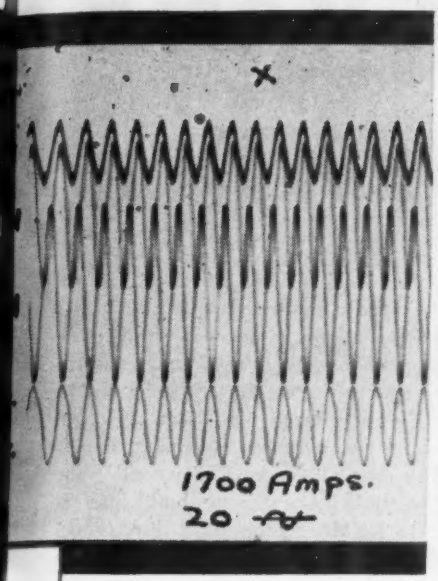
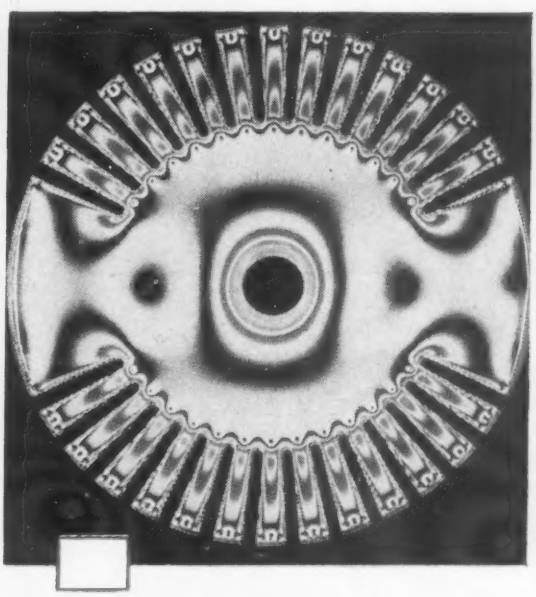


INSTRUMENT RECORDING is used to record accurately electrical or mechanical phenomena too rapid for the eye to follow.

PHOTOMICROGRAPHY is used to show, at magnifications up to 5000X, grain structure changes created by varying alloy compositions.

SPECTROSCOPY is used to make accurate qualitative and quantitative chemical analyses in a flash . . . to make tests during operations.

PHOTO LAYOUT is used to reproduce dimensions, instructions on metals, plastics, or other materials . . . to make templates, dials, name plates, wiring diagrams, etc.



STRESS ANALYSIS is used to provide advance information on performance of new parts by showing intensity and distribution of stresses in experimental designs.

PHOTO-VISUALS—motion pictures, film strips, slides—are used to train workers . . . to show them—graphically, quickly—how to perform production operations.

Eastman Kodak Company, Rochester 4, N. Y.

To see Functional Photography at work, visit the Kodak exhibit at the Metals Congress and Exposition in Atlantic City, November 18-22, booth C155.

Kodak

Selecting TRAVELING-CRANE EQUIPMENT

Choice depends considerably on individual interpretation of crane makers for service demands of job in question. This is based on experienced judgement gained from previous installations of the equipment

By R. J. WADD
Executive Chief Engineer
and
F. M. BLUM
Manager, Overhead Crane Sales
Harnischfeger Corp.
Milwaukee

IF every traveling crane installation were to be made on the basis of the exact loadings and travels required, selection of the proper size, and of the auxiliary equipment would become a fairly simple engineering matter. Unfortunately, except for bulk handling plants and production line layouts, very few installations are capable of any more than very general limitations of loading and material movements. Selection of crane equipment for economic investment and maintenance, therefore, depends considerably upon individual interpretation of the different manufacturers for the service demands in offering their equipment for the job in question. This selection is normally based on the experienced judgement of similar or allied installations.

Table I is offered as a suggested classification of duty service that could be used as a basis of common measurement, while Table II is a guide to efficient hoist, trolley and bridge operating speeds of various capacity types.

Service limitation can in general be translated into loading ratings of the manufacturer's trolley and bridge drives as shown in Table III. By proper selection of these capacity frames, engineering designs will allow the entire field to be adequately covered for service requirement without special or overlapping frames, or leaving any service demand gaps.

I-beam type girders are entirely adequate for the shorter spans in classes 1, 2 and 3, while welded box selections offer maximum service performance in the longer spans and especially for class 4 and 5 services. Bridge drive design of the stationary pin type is satisfactory for class 1 and 2, but conventional Master Car Builders design for heavy duty services should be incorporated for classes 3, 4, and 5, with heat treated wheel trends. Double bridge drive should be used on four wheel type cranes on bridge speeds in excess of 500 fpm for classes 3, 4, and 5. Surface hardening of gear teeth and like wearing parts will provide the necessary service life of the design for class 4 and 5 services.

In the selection of the electrical equipment by duty classification the mean root square method is used to determine frame sizes for horsepower demand, as required by the several duty classifications limited by the capacity, suggested operating speeds and allowable lifts per hour. Actual electrical equipment, such as brakes, control, resistors and protective equipment, are selected to meet both horsepower demand and service requirements.

Motors: All direct-current operated motors should possess certain inherent characteristics as well as mechanical features, in line with modern, up-to-date practices. All motors should be totally enclosed and provided with antifriction bearings, a large diameter shaft, preferable with a taper on the end on which the brake wheel is mounted. They should be series wound, provided with a full number of interpoles to insure perfect commutation over all load conditions, designed to provide ease in inspection of the commutator and brushes, and ease in access to the terminals in case of motor failure. Due consideration should be given to the selection of a motor that would provide the least amount of down time of the crane for making any armature change or complete motor change. Split frame construction in this respect would be a very desirable feature.

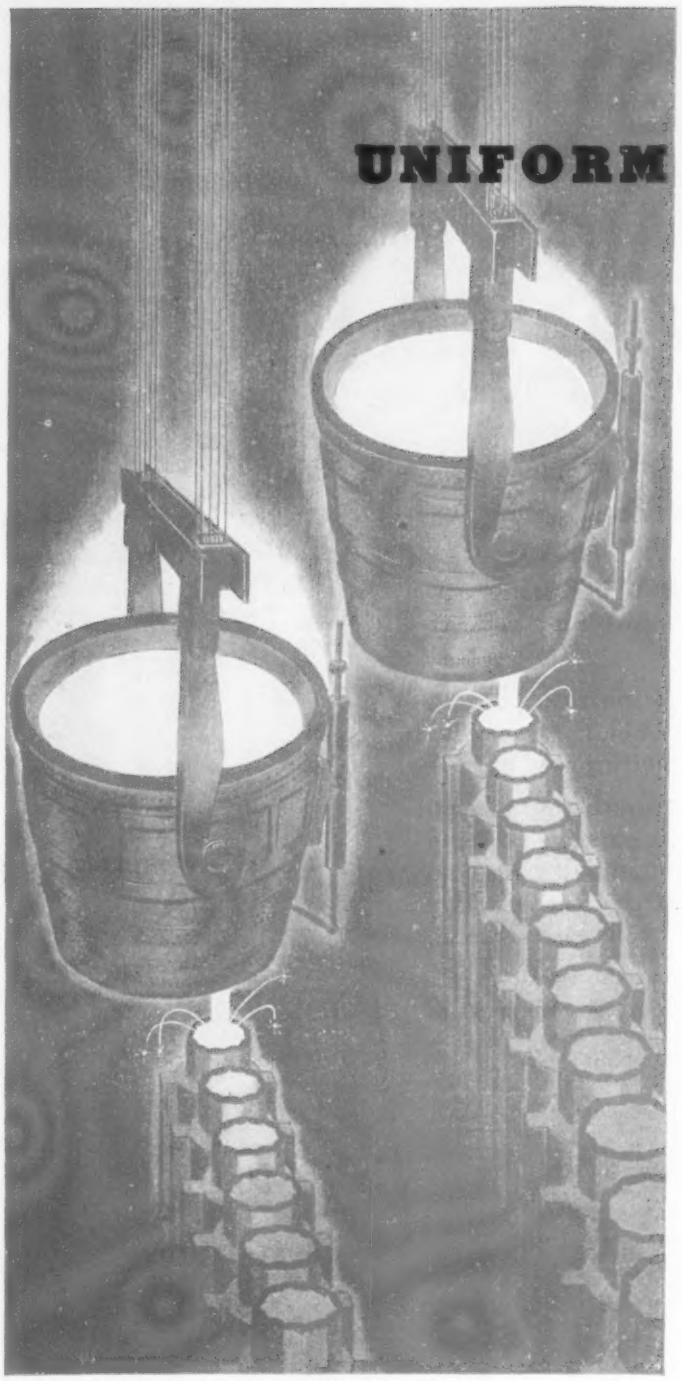
For alternating-current operated cranes, the slip ring or wound rotor type of motor is best used since squirrel cage motors do not have the ability to provide good speed regulation, which is essential on overhead traveling cranes in handling all loads. The wound rotor motor should be sturdily built, preferable to NEMA standardized dimensions, with a tapered shaft exention on the brake end of the motor for easy removal of the brake wheel. It shall be of the antifriction bearing type, grease lubricated, with a capsule mounted bearing. The stator of this motor should be constructed so that laminations are well anchored and cannot work loose due to reversal service to which the motor is subject. Well braced motor windings are able to withstand plugging, and if well insulated, provide long, uninterrupted performance under service conditions. The slip rings should be made of bronze, brushes and rings to be selected to prevent pitting under plugging service.

Wound rotor induction motors as usually applied to overhead traveling cranes are built in open type, rated 30 min 50 degrees; the enclosed tvpe rated 30 min 55 degrees; externally fan-cooled rated 1 hour, 55 degrees. From the standpoint of price, the open motor is cheaper than the totally enclosed motor. On the other hand, the totally enclosed motor pays for itself during operation over a period of time.

Class I Cranes: Determine the horsepower of the hoist motor from the foot-tons and speed required. Select a motor of standard rating on the basis of at least a 15 min rated frame size, using the same horsepower calculated, or slightly higher. This statement should be supplemented with the thought that the length of lift that the crane is subject to must be given consideration when selecting a 15 min rated motor. When the lift is excessive a 30 min rated motor must be used.

Bridge and trolley motors are selected on the basis of determining the running horsepower required. For a full roller bearing crane, select a horsepower using ratio shown in Table V.

This ratio will give sufficient motor power for the acceleration of the crane.



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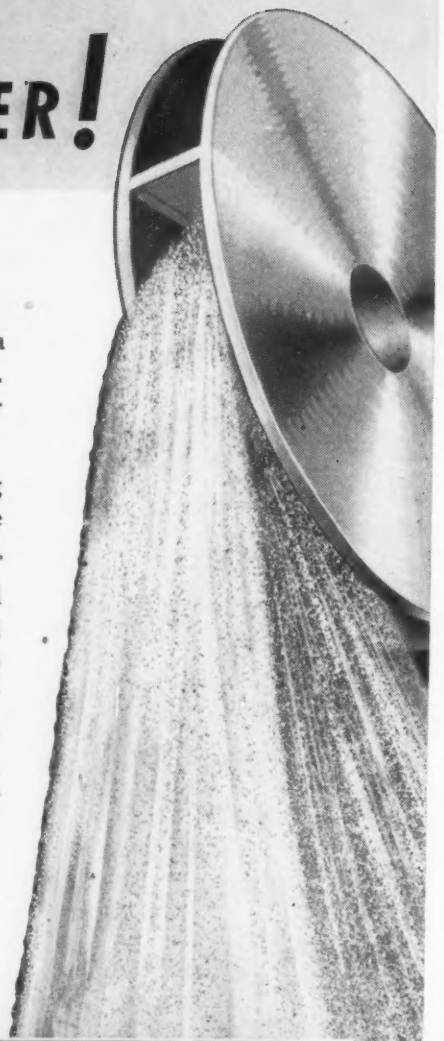

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Speed cleaning at low cost results from the flood of abrasive that pours in a constant torrent from the spinning wheel of an Airless Wheelabrator . . . impacts from more than a quarter-million particles of abrasive per second or 300 pounds of abrasive per minute.

In terms of airblasting it would take approximately five 3/8″ nozzles operating under an air pressure of 90# P. S. I. and utilizing up to 225 H. P. to equal the foregoing accomplishment of a standard Wheelabrator requiring only 15 H. P.

The blast stream of the Wheelabrator is under perfect control and the full impact of its power is uniformly concentrated upon the job, scouring sand and scale from every pocket, recess, and fissure. Unlike airblasting there are no variations in pressure, velocity or abrasive volume to alter cleaning efficiency and production speeds. Wheelabrating can be timed practically to the second.

Savings result from reduced costs of labor, power, space, machining and grinding, cutting tools, inspection, etc., as reflected in the following statements of users:

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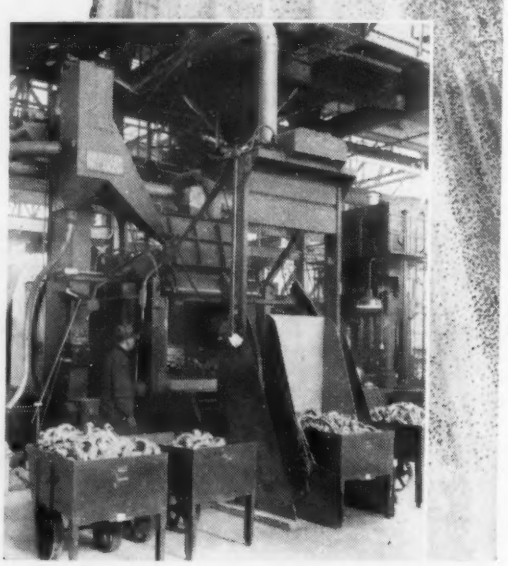
"Reduced cleaning time approximately 50%."	(Malleable Foundry)
"Reduced direct labor costs 50%."	(Automotive Mfr.)
"Saved 300 cubic feet of air per minute."	(Malleable Foundry)
"5 hours' cleaning time reduced to 15 minutes."	(Michigan Mfr.)
"Our Electric bills have been cut almost in half."	(Gray Iron Foundry)
"Cleaning now with four less operators."	(Gray Iron Foundry)
"Time cut from 24 hours to 8 hours."	(A Connecticut Steel Foundry)
"Decided increase in tool life between grinds."	(Prominent Tool Mfr.)
"Replaced 14 tumblers, saving considerable space."	(Canadian Mfr.)
"18 hours' cleaning time reduced to 3 hours."	(Brass Foundry)
"Machinability much improved over tumbled castings."	(Gray Iron Foundry)

* Names of users supplied upon request.



WHEELABRATOR

TUMBLASTS

Tumblasts are made in eight sizes, having capacities of 1 to 63 cu. ft. for handling loads ranging from less than a hundred pounds to several tons, and for cleaning individual parts weighing from a fraction of an ounce up to hundreds of pounds each.

TABLES

Tables are used for cleaning flat or fragile work that is not adapted to tumbling. Built in three types: The *Multi-Table* is recommended for work having high vertical edges or intricate recesses and cavities. The *Plain Table* is especially suitable for work having few pockets and vertical edges, such as furnace castings. The *Swing Table* is an ideal general purpose machine for handling a wide range of large and small pieces.

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Cabinets are specially designed and engineered for handling work where special production problems prevail or where the work, due to size, shape or weight, cannot be adapted to a standard machine.

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WORLD'S LARGEST BUILDERS OF AIRLESS BLAST EQUIPMENT

For a sleeve bearing crane, this ratio should be increased by the difference between antifriction and sleeve bearing friction valves. It should be pointed out that selection of too large a motor for these drives will definitely sacrifice speed regulations and cause the crane to start very abruptly.

Class 2 Cranes: Selection of motors for light duty cranes is made in the manner described above, except that no consideration is given for the 15 min rating as all motors are rated on the basis of 30 min., 55 degrees.

Class 3 Cranes: Here, again, method employed for selection of motors is the same as described for class 2 cranes, and motors are rated on the basis of 30 min, 55 degrees with normal frame output.

Class 4 Cranes: For constant duty cranes, the same method is employed as described above, and motors selected on the basis of 30 min, 55 degree rise. However, heating effect of the motor should be checked by mean root square method for frame size and motor size corrected accordingly. Ambient temperature as well as altitude must also be considered.

Class 5 Severe Duty Cranes: In this classification, particularly where magnet and grab bucket cranes are involved and operated by direct current, the hoist motors should be selected carefully. Usually, on magnet and grab bucket cranes a definite duty cycle can be determined, and in most cases the amount of material to be handled per hour is known, on which basis mean root square method can be used to determine heating of the motor. For the majority of such applications if one does not utilize more than 60 per cent of the rated horsepower of a 30 min rated motor, the thermal capacity of the motor will be sufficient.

A direct current operated motor does not have the ability to radiate heat as well as the alternating current motor, since the internal heat of the motor must first pass through air before it is radiated from the motor frame. In this classification, particularly on grab bucket cranes, the space factor for too adjacent motors may be such that due consideration must be given to class B insulation. On hot metal cranes, etc., which are to be used for this constant use service, class B motors should definitely be used. Bridge and trolley motors for roller bearing cranes should be selected on the basis of running horsepower multiplied by the ratios shown in Table V. Bridge and trolley drive motors for sleeve bearing cranes should be selected on the basis as outlined under class 1 cranes.

Selection of alternating current wound rotor motors on the basis of crane classification for classes, 1, 2, 3, 4, can be

(*Please turn to Page* 224)

TABLE I

SUGGESTED SERVICE DUTY CLASSIFICATION

Class 1—Standby Duty (power house, motor room, etc.). Slow speed, occasional use, service life of parts and equipment equals minimum. Maximum demand full load lifts per hour equals two to five.

Class 2—Light Duty (machine shop, etc.). Moderate speed, infrequent lifts, service life of parts and equipment equals short. Maximum demand full load lifts per hour equals five to 10.

Class 3—Moderate Duty (light foundry, mill service, etc.). Fast speeds, normal use, service life of parts and equipment equals normal. Maximum demand full load lifts per hour equals 10 to 20.

Class 4—Constant Duty (heavy foundry, production line work, hot metal, etc.). Fast speeds, steady use, service life of parts and equipment equals long. Maximum demand full load lifts per hour equals 20 to 40.

Class 5—Severe Duty (magnet, grab bucket, steel mill, stockyard, etc.). Fast or extra fast speeds, constant use, service life of parts and equipment equals maximum. Maximum demand full load lifts per hour equals 40 to 80.

TABLE II

SUGGESTED OPERATING SPEEDS

	SLOW			MODERATE			FAST		
Cap.	Hoist Speed	Trolley Speed	Bridge Speed	Hoist Speed	Trolley Speed	Bridge Speed	Hoist Speed	Trolley Speed	Bridge Speed
3	33	125	250	45	175	350	65	200	450
5	25	125	250	40	175	350	65	200	450
7½	25	125	250	35	175	350	45	200	450
10	25	125	250	33	175	350	45	200	450
15	20	125	250	32	175	350	42	200	450
20	15	125	250	24	175	350	32	200	450
25	14	125	250	18	175	350	25	200	450
30	12	125	250	18	175	350	25	200	450
35	12	100	200	17	150	300	20	175	400
40	11	100	200	17	150	300	20	175	400
45	10	100	200	16	150	300	20	175	400
50	10	100	150	14	150	250	20	175	300
60	10	100	150	15	150	250	20	175	300
75	9	75	150	13	100	250	16	125	300
85	8	75	150	13	100	...	..	...	...
100	8	75	150	11	100	...	..	...	...
125	6	75	100	8	100	...	..	...	...
150	5	50	100	7	75	...	..	...	...
175	4	50	100	6	75	...	..	...	...
°200	4	35	100	6	50	...	..	...	...
°250	3	35	100	5	50	...	..	...	...
°300	3	35	100	4	50	...	..	...	...

(°) Double trolley crane.

NOTE: Extra fast speeds as may be required under Classification 5 (Severe duty) will be selected to meet the exact duty cycle conditions of those installations demanding high tonnage capacity or its equivalent in crane output.

TABLE III

TYPICAL LOADING ON 20-TON TROLLEY FRAMES FOR SERVICE CLASSIFICATION

Class 1—Standby Duty
150 per cent of nominal load rating ..... 30 Ton.

Class 2—Light Duty
125 per cent of nominal load rating ..... 25 Ton.

Class 3—Moderate Duty
Nominal load rating ..... 20 Ton.

Class 4—Constant Duty
75 per cent nominal load rating ..... 15 Ton.

Class 5—Severe Duty
50 per cent nominal load rating ..... 10 Ton.

TABLE IV

SUGGESTED SERVICE LIFE FOR BRIDGE AND TROLLEY DRIVES AND LOAD FACTOR (ANTI-FRICTION BEARING DRIVES)

Class 1— 3000 Hours Minimum—Load Factor 1.25
Class 2— 5000 Hours Minimum—Load Factor 1.00
Class 3—15,000 Hours Minimum—Load Factor .75
Class 4—30,000 Hours Minimum—Load Factor .60
Class 5—50,000 Hours Minimum—Load Factor .50

(These load factors to be applied to the allowable load and speed chart for the manufacturer's design.)

TABLE V

RATIO RATED HP FOR TROLLEY AND BRIDGE MOTORS RUNNING HP ALLOWING FOR ROLLING AND FLANGE FRICTION, TRACK CONDITION AND ACCELERATION.

		Close Speed Control		Standard Crane Control		
Drive	Speed in F.P.M.	Class 1&2 30 Min. Rated Crane Motors	Class 3 30 Min. Rated Crane Motors	Class 3 30 Min. Rated Crane Motors	Class 4&5 1 Hr. Rated Crane Motors	Class 4&5 30 Min. Rated Mill Motors
Trolley	75	1.3	1.4	...	...	...
Trolley	150	1.4	1.5	...	...	...
Trolley	225	...	1.6	1.7	1.7	2.0
Trolley	300	...	...	1.8	1.8	2.1
Trolley	375	...	...	1.9	1.9	2.2
Trolley	450	...	...	2.0	2.0	2.3
Bridge	150	1.8	1.9	2.0	...	...
Bridge	300	2.0	2.1	2.2	2.2	2.5
Bridge	450	...	2.3	2.4	2.4	2.7
Bridge	600	...	...	2.6	2.6	2.9
Bridge	750	...	...	2.8	2.8	3.1
Bridge	900	...	...	3.0	3.0	3.3

NO LEAKS, MINIMUM WEAR IN JOHNSON ROTARY PRESSURE JOINTS WITH graphitar SEALS

(CARBON-GRAPHITE)

Shown above right is a sectional view of the Johnson rotary pressure joint installed on textile mill dry cans pictured immediately above. This joint, manufactured by the Johnson Corporation, has no packing to wear out, needs no oiling or adjusting, and absorbs misalignment, both lateral and angular. A large share of this efficient dependability is due to the Graphitar seals which are a vital part of the joint design. These Graphitar seals form the bearing and seal surfaces between the stationary and rotating members. They are mechanically strong, chemically inert, self-lubricating, heat resistant, and will not warp or distort. The Johnson Corporation uses Graphitar seals exclusively on its rotary pressure joints for equipment handling steam, water, hot oil, trichloroethylene, powdered talc, air, etc.

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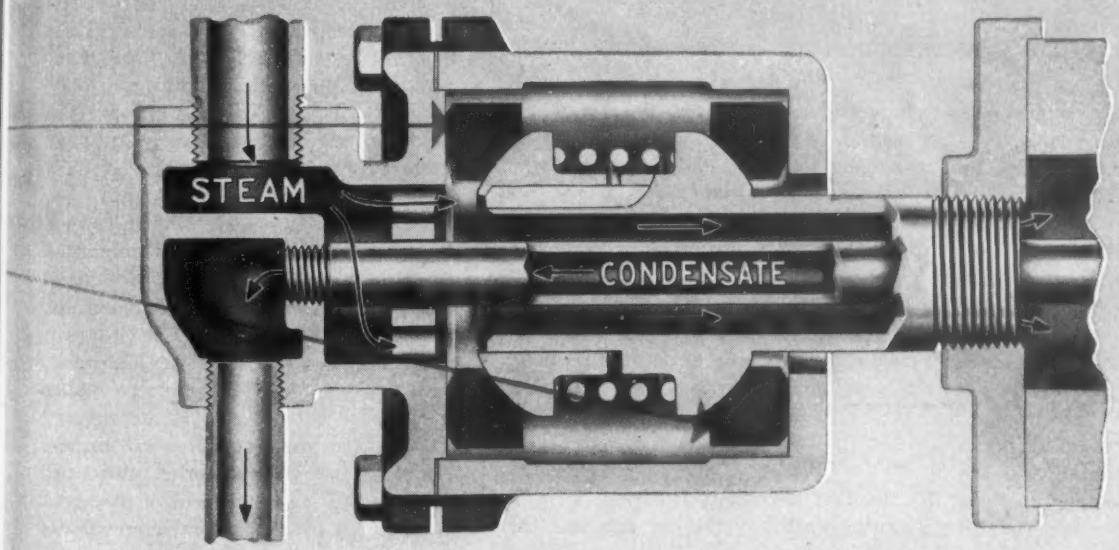
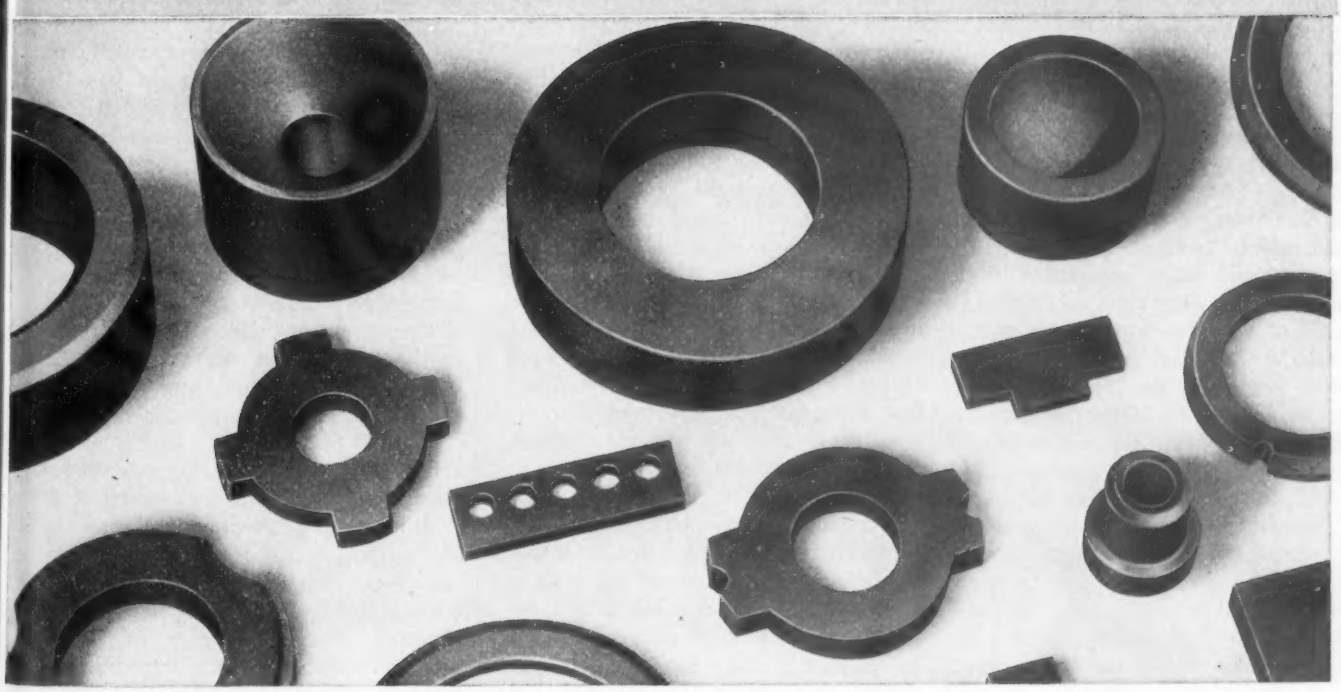
In scores of other installations where operating conditions involve extreme heat or cold, chemical attack, high speeds, and other unusual factors, Graphitar seals, rings, cylinder liners, and compressor blades assure continued efficient mechanical performance. Graphitar sump pump bearings immersed in gasoline, kerosene, alcohol, molten salt, asphalt, and other corrosive solutions; Graphitar blades in rotary compressors handling air, Freon, chemical gases, etc. are a few of the many successful Graphitar applications. Graphitar parts may be the key to better mechanical performance for your products at lower cost. Send us a sketch or description of your products for full particulars, and write today for 44-page illustrated catalog.





COMPANY • SAGINAW, MICHIGAN

Oxygen Reduces Melting Time of

OPEN-HEARTH HEATS

Basic Steelmakers using this gas experimentally report fuel savings, increased life of furnace and elimination of foam on high-scrap heats. Practice calls for faster charging time, modernization of scrap handling facilities and new type recording instruments. Report on hot metal quality questionnaire analyzed

REGISTRATION at the joint meeting of the Southern Ohio section, National Open Hearth Committee, and the Ohio Valley section of the American Institute of Mining and Metallurgical Engineers, Deshler-Wallick hotel, Columbus, O., Oct. 25-26, totaled 307—the highest attained since the initial meeting of these two groups 10 years ago.

Next year's meeting will be held at the Deshler-Wallick hotel, Columbus, O., Oct. 31 and Nov. 1.

One of the most important subjects discussed at this year's meeting was the use of oxygen in the open hearth. One speaker in describing experiments at his plant pointed out that oxygen was introduced into the checkers to replace the regular volume of air used to support combustion. He found that the introduction of this gas adjacent to fuel oil furnished a quick release of the elements in the oil. The hot flame which results under the use of oxygen rapidly loses its heat as long as scrap is in the furnace. Moreover, it was found that the intensity of the flame had little effect on refractories. An increase in the fuel input ranging from 32 to 65 per cent was tried but practice showed 40 per cent as the most efficient quantity of oxygen to fire. The use of this amount of oxygen with fuel oil showed a fuel saving of 17 per cent, an increase in the life of the furnace and a reduction in the amount of brick per ton. Melting time was reduced 2½ hours. However, the speaker emphasized that scrap handling facilities must be modernized when oxygen is used and various types of recording instruments devised.

Another speaker in discussing the use of oxygen in the open hearth pointed out that the fuel input and the furnace efficiency are boosted when oxygen is added. Under its use melting time is reduced substantially and he warned that furnaces would have to be charged faster. Larger charging boxes and doors, the location of the stock yard close to the charging floor and the firing of oxygen will increase the tonnage of an open hearth from 25 to 30 per cent of the meltdown time. Furthermore the use of oxygen in the bath will cut another 10 to 15 per cent off the meltdown time. The speaker emphasized that if the furnace cannot be charged in 2½ to 3 hours the use of oxygen should not be considered.

Oxygen Used for 4 Hours

Further discussion of oxygen in open-hearth heats brought out the fact that yields are from 2 to 3 per cent higher than conventional practice; iron oxide ranges from 8-1/2 to 9 per cent compared to 11-1/2 to 12 per cent in average practice. Oxygen is used in the furnace for about 4 hours or until heat is well melted and then it is taken off the furnace when the lime boil starts. Approximately 130,000 cu ft of oxygen is used during the 4-hour period. Experiments also disclosed that the lighter the scrap the better it melts down. The best practice is to charge as much of the scrap as possible with pig iron in the No. 1 door inasmuch as it takes a longer time to melt down the charge opposite the middle door. Furnace reversals range from 12 to 14 min. It was also pointed out that if oxygen is obtainable at 25 cents per 1000 cu ft its use certainly will save a lot of money in the production of open-hearth steel.

A central west operator reported on the use of oxygen as an atomizer on a 100-ton furnace. He pointed out that a Crow artillery type burner with a 3/4-in. opening for oil and steam and surrounded by another opening for gas, was employed. A test run on 24 heats with oxygen indicated that high-fuel input is not desirable. When 60 to 80 cu ft of oxygen was used per gallon of fuel oil it was found possible to scale down the fuel input rate from 475 to 350 gph. The test showed the outgoing ends of the roof became white hot with high-fuel input but wen 350 gph was used the roof remained cool. The scrap meltdown was normal and under high-fuel input the scrap melting was the same at the outgoing end of the furnace as at the incoming end.

Another test at this particular shop involved the use of oxygen with 11 heats made around the clock. The oxygen was shut off after the last edition of hot metal. Tests indicate the use of oxygen is effective in knocking the foam off high-scrap heats. An average of 50 cu ft of oxygen per cubic foot of fuel oil fired was employed. Tests also indicate that oxygen in excess of 80 cu ft per gal of fuel oil is not effective. A flame temperature ranging from 3400 to 3500° F is satisfactory. Based on seven scrap heats the cost of oxygen per ton of steel produced was $1.30, whereas on 17 flush heats the cost was $1.23 per ton.

At the opening session of the Open Hearth group a report was submitted covering the questionnaire on hot metal quality recently submitted to steelmakers. Replies from 80 per cent of open-hearth shops indicated the desire for high manganese metal. The majority of the replies stated that benefits are to be derived through the use of hot metal mixers. Eighteen per cent reported they use desiliconized hot metal and 36 per cent desulphurized iron. General opinion was to the effect that turnings are not detrimental to open-hearth quality steel. Practically all shops desired a silica-manganese ratio of 2½ to 3. Concerning manganese in the pig, 12.2 per cent of the shops want 1 per cent maximum manganese, 81.7 per cent want from 1 to 2.25 per cent manganese and 6 per cent desire over 2.25 per cent manganese. For basic practice 12.8 per cent of the shops want 0.60 to 1.00 per cent silicon, 6.8 per cent desire 0.75 to 1.25 per cent silicon, and 19 per cent want up to 2 per cent silicon. Concerning phosphorus in the pig for basic practice 4.1 per cent of the shops want under 0.10 per cent, 18.4 per cent want under 0.1 to 0.2, 71.4 per cent want phosphorus 0.2 to 0.5, and 6.1 per cent took phosphorus from 0.5 to 1.00 per cent.

In discussing pig iron conservation versus quality of metal an operator of a cold metal shop mentioned that with iron charges up to 1000 lb, sheet bar heats were benefited: Cleaner steel was made and a better galvanizing practice obtained. The speaker pointed out that high-iron charges save the furnace pick up temperature and give a good lime boil. He emphasized that with a good lime boil his shop obtained good heats regardless of what happens during

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the last hour the heat is in the furnace. A good lime boil, he stated, gives better mechanics to the heat and affords a better quality steel.

Use of an oil burner operating at 650 psi was described by a valley steelmaker. The purpose of the burner, he pointed out, was to get full pressure back of the mixing box. The nozzle was made of tool steel drilled under size and then reamed out to allow 400 gal of oil to move through the mixing box and into the furnace. This, he stated, gives a good flame. A pressure pump is employed to pass the oil through a 3-in. line without any circulation. That is, he explained, the fuel is pumped against a dead end line. A release valve was installed at the pump. The oil is heated to 200°F; steam temperature ranges from 600 to 800°F. As long as good heavy oil was available the burner worked satisfactorily but with lighter fuel oil operation is not so good, the speaker stated. The furnace uses from 25 to 26 gal per ton with 25 to 26 per cent hot metal in the charge. There are no more oil leaks in the line than when the fuel was used at 180 psi pressure. In operation, the pressure is left in back of the burner to get the maximum flow of 360 gph, and when the furnace gets too hot a cut back is made. Pressure at the end of the burner is about 470 psi; steam pressure is 100 lb at the 1-in. opening at the burner.

Experience of one steelmaker in the use of Canadian Steep Rock iron ores is that less lime is required because of the lower silicon content compared with the grade of ore generally employed. Where Steep Rock ore is used furnace blows are less frequent and severe. Savings in heat time amount to 17 min on structural grades and 52 min on strip steel grades. Average open-hearth yields are 0.2 per cent greater than comparison heats and the average tapping slag weights 10,000 lb lower.

Preparation of scrap has greatly increased the charging rate of open hearths at an Ohio shop. Under former practice the average weight of decoiled scrap in a 20 cu ft pan was 500 lb. Since the weight per pan is a major factor, present practice is to cut this type scrap into small pieces and wrap them with bands into bundles 72 x 24 x 18 in. These weigh 2000 lb and fit into the charging pan. While there is some additional cost in handling yet it is much less than formerly. Cold rolled processing scrap arises in coiled ends. This is flattened and bundled to 1500 lb weights. Side and end shearings are wire wrapped in bundles of 2500 lb. Hot rolled processing scrap usually is in long lengths and tangled. These long pieces are now cut in half and bundled in 3000 lb weights.

At a plant in the Chicago district three different sizes of charging boxes are employed, namely, 19, 27 and 37 cu ft capacities. In considering the average weight of scrap per pan a speaker pointed out that the weight of pans is not always in proportion to the size of the pan. Discussion brought out that the average life of the charging box is about five years. On an 8-furnace shop 94 buggies with 37 cu ft boxes have been found ample. At a 14-furnace shop using 44 per cent hot metal, 130 buggies with 27 and 19 cu ft boxes have been found sufficient to move material from the stock yard to the charging floor.

Cleaning Protects

LIFE OF WIRE MILL DIES

Establishment of time cycle for removal of scale from surface of wire is recommended. Cobalt smear on surface of carbide die shortens useful service of die. Three steps in preparation of metallographic specimens greatly simplifies method of polishing. Digest of papers presented at annual meeting of Wire Association

CHICAGO was chosen for the 1947 Wire Association conference. It is to be held at the LaSalle hotel the third week in October. Attendance at this year's conference at Hotel Statler, Buffalo, Oct. 21-24, was 400.

Important details of wire drawing, steelmaking for rope wire and metallurgical practice brought out at the various technical sessions are as follows:

Mill Practice—Care of Dies: The author of this paper, R. R. Preston, engineer, Carboloy Co. Inc., Pittsburgh, mentioned that many plants are now going into drawing high-carbon, fine wire, shape wire and some stainless steel as well as planning to draw at higher speeds and in some cases special finishes. To do this efficiently requires close attention to mill layout, scheduling, cleaning, lubrication, die room layout and care of dies.

Material should flow in a straight line and with as little handling as possible. Less scrap is made when ample working space is provided in the wire mill and at the finishing end for trucks and skids. Moreover, there is less chance of mixed stocks.

Scheduling the rod mill, the cleaning department and each draw bench or group of benches a week in advance is highly important. When stock is not available the wire drawer is compelled to change the sizes of his dies and this is a costly practice.

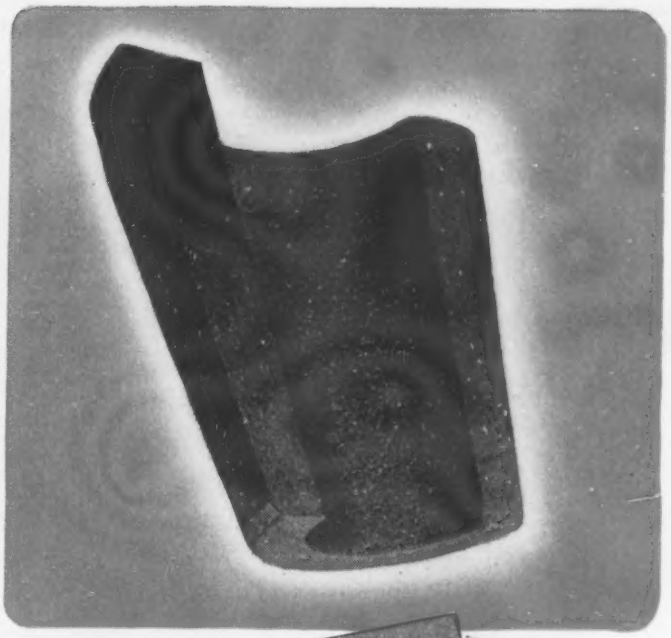
A time cycle and practice for scale removal should be established. Mills about to draw patented wire to finer sizes must spread out the wire on yokes before pickling. Higher speeds mean higher output and this is obtained by more efficient pickling and cleaning.

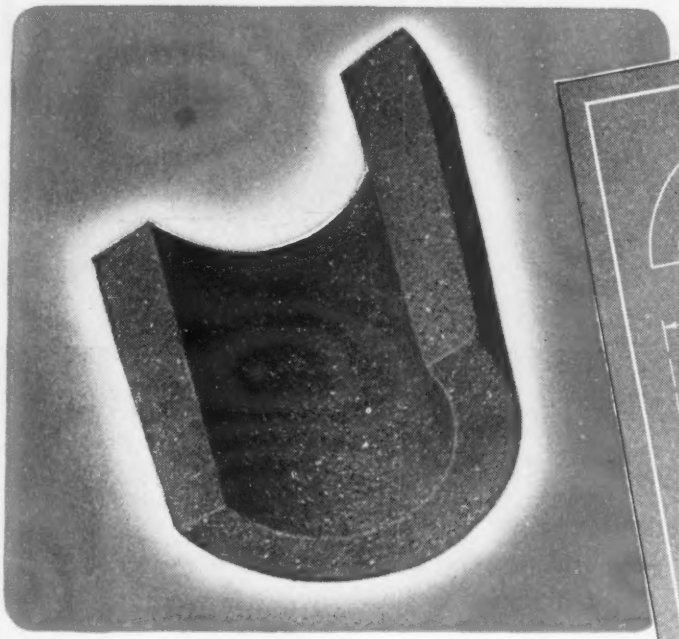
The number of lime dips depends upon the number of drafts to which the wire is drawn. Carbide dies will stand considerable abuse but if the stock is not cleaned and limed properly, die life will be affected. At some plants wire is cleaned, washed, and coated with a lime substitute before being fed to the patenting furnace takeup frame, thus increasing the life of the finishing dies from 8 to 72 hours.

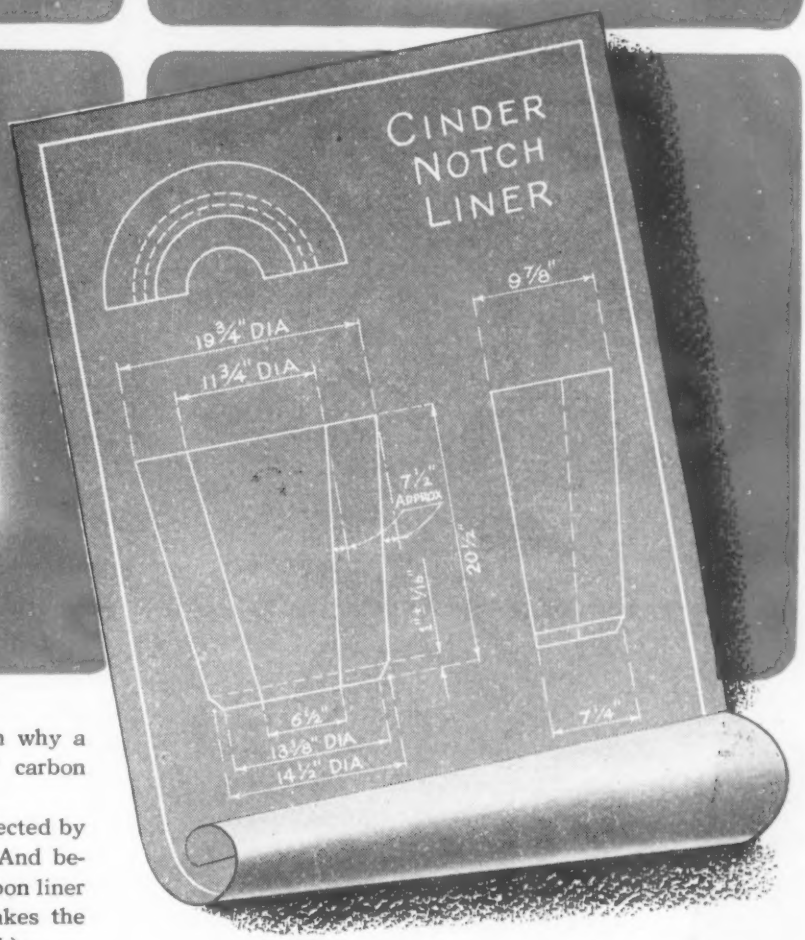
Where the most care is taken in preparing the stock, and polishing the dies each day the best die tonnage is secured. Successful wire drawing is the result of a combination of proper cleaning, correct lubrication or of good dies.

In discussing this paper one speaker mentioned that in the manufacture of carbide dies the carbide is held in position by cobalt. He recommended care in polishing the carbide die pointing out that if the cobalt is smeared over the surface of the carbide the die will not render satisfactory service. Much emphasis is placed on the polish imparted

How Long will a CARBON CINDER NOTCH LINER Last?







IF INSTALLED properly, there is no reason why a cinder notch liner made of "National" carbon should not last for *many years!* Why?

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to the die by the diemaker but the speaker attached little importance to this because in the early drawing operation the first few feet of the wire removes the polish leaving the surface matted. This matted condition, he explained, traps the lubricants and gives longer die life.

Methods for Polishing Metallographic Specimens: In this paper by F. G. Anderson, chief metallurgist, and R. E. McGraw, metallographist, National Lock Co., Rockford, Ill., are described three steps involved after filing for grinding the surface. The first is grinding on the lead lap; the second is the semipolish on a paraffin wheel; and the third is the final polish on the synthetic cloth. By this procedure there are fewer transfers of position and less time lost when cleaning and washing the hands between operations.

The lead lap is made of solder instead of lead of either 50-50 or 70-30 grade. A conventional 8-in. polishing disk is set level and a band clamped around to form a sidewall ¼-in. high using a small asbestos string as stuffing against leakage. Solder is melted by a bunsen burner directed against the top of the disk until a pool of molten metal ¼-in. deep is obtained.

When cooled the band is removed and the disk mounted in a lathe to cut the top face smooth, flat and square. Grooves are cut with a 60° milling cutter 1/16-in. deep to form numerous cords instead of radii or spirals. Grooves are about ¼-in. apart and at 90° of one another to form ¼-in. squares. The lead lap is used for coarse grinding. By applying American optical 302 emery with water (one teaspoonful of emery in 200 cc water) directly on the rotating wheel while a specimen is lightly held against it, the solder soon becomes inpregnated and will not show signs of wear until several hundred samples have been prepared. After this it can be faced level without need of regrooving. After two or more refacings it can again be regrooved without cutting through the solder.

During the rough grinding stage the lead lap is kept wet by frequent application of water and emery mixture. The specimen is slowly moved across the wheel to various positions of the grinding path. The sample is given either a twisting motion to produce random directional scratches or held in such a manner that parallel scratches are produced. Grinding progresses readily without pressure on the sample and file marks or original grinding scratches are removed quickly. Wheel speeds ranging between 200 and 600 rpm are satisfactory.

A flat surface thus is developed. The sample and mounting material are both cut evenly in the same plane, so that no time is lost in the next step.

Instead of using a smoothly cut surface with grooves on the paraffin wheel, a naturally rough surface is produced by inherent solidification properties of two grades of paraffin with different melting points.

A brass or bronze disk must be used to which is fastened a retainer band holding a ¼-in. deep pool of molten paraffin. The disk is leveled so that rotation is in a true horizontal plane. Two parts of paraffin (68 to 72°C melting point) to one part of soft parawax is melted and poured on the disk to a thickness of ¼-in. When cool the paraffin is again melted with a long flame from a bunsen burner. When the disk becomes entirely visable the mass is cooled in still air to room temperature. Melting and cooling require about 70 min and the surface is left with numerous small round projections or pimples to a uniform height. Incomplete remelting produces a surface that is too smooth; overheating causes large wavey projections that are not satisfactory.

This wheel is operated between 200 and 600 rpm. Edges of the sample mount are beveled to avoid scraping the surface with any sharp edges. When the small projections become flattened after continued use the wheel will fail to grind and it is only necessary to scrap the surface reasonably clean and remelt and solidify the paraffin as before.

The abrasive used on paraffin wheels is one teaspoonful of 600 grit carborundum to 200 cc of soap solution consisting of 50 grams of green oil soap per liter of water. The sample is moved slowly across the wheel to remove the scratches previously produced by lead lapping. The surface condition should be inspected microscopically to make certain that the bottom of previous scratches are completely removed before proceeding to the final polish.

Synthetic cloth, known as gamal cloth, is used for final polishing. The flock or nap is rayon fiber about 0.0008-in. diameter and precut to 1/32-in. long. A dense pile is electrostatically driven into a layer of either rubber cement or vinyl butyral that has been spread evenly over the base cloth. This cloth is waterproof; abrasives do not filter through and pile up under the cloth. The nap never becomes water soaked nor changes in physical characteristics when wetted. It polishes evenly across the entire surface of specimens. Inclusions can be retained even by reasonably prolonged polishing.

Operating speed of this wheel is about 250 rpm. Abrasive used is gamal concentrate diluted with 20 parts distilled water to one part of the concentrated and neutralized with triethanolamine to a pH of 7 to 1½.

The foregoing method of polishing meets the general requirements. Each wheel performs its task without much training or experience on the part of the operator. The weight of the sample supplies enough pressure on each of the wheels and the amount of abrasive is not critical. It is probably the most suitable for those laboratories which do not employ full time polishers.

Demineralized Water in the Wire Mill: The author, Dr. F. R. Morral, metallurgist, American Cyanamid Co., Stamford, Conn., announced that demineralized water containing as low a percentage of solids content as distilled water, can be made available as readily and nearly as cheaply as ordinary tap water without distillation. Certain synthetic resins having remarkable ion-exchange characteristics are employed in the process of demineralization. One of these resins is a cation-active material and another is an anion-active material. The speaker explained that water containing sodium chloride is filtered through a bed of hydrogen-activated cation resin. The resin takes sodium to form sodium resin and gives up its hydrogen which with the chloride forms dissociated hy-

(*Please turn to Page* 240)

SHEET METAL TRAINING: Shown here working under guidance of company blacksmith, trainee of new 2-year sheet metal training course at Caterpillar Tractor Co., Peoria, Ill., places heated angles in bending fixture to shape them into frames for screen guides. Designed to instruct applicants in many phases of structural and sheet metal fabrication, the course includes work in both the shop and classroom

Industrial Equipment

Center Drilling Machine

Single lever controls all operations, including automatic positioning, clamping and feeding on the high production center drilling machine (immediate right) produced by Detroit Tap & Tool Co., 8432 Butler avenue, Detroit 11. Machine handles a wide range of shapes and sizes. Concentric centers may be drilled in round, square or other shaped stock ranging from ⅛ to 2⅜-in. OD.

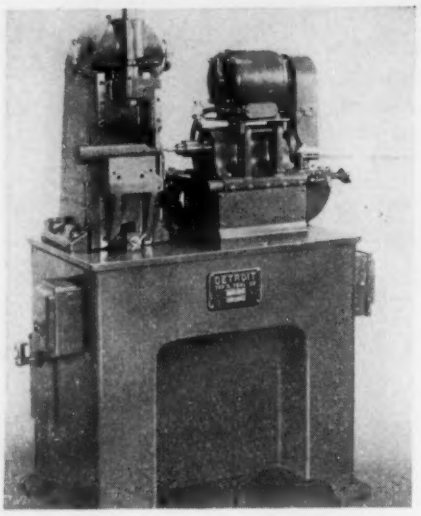
Self-centering vise clamps work in concentric alignment with centering drill, being actuated by a hydraulic cylinder. Drill head is of cartridge type with ball bearings traveling on hardened and ground adjustable ways. Drill has three speeds, 1250, 2400 and 5200 rpm, obtained through a V-belt step pulley drive from spindle drive motor. Another motor drives gear type hydraulic pump through a flexible connection. Spindle chuck has a center drill capacity of from A-1 to J-2 (⅛ to ½-in. OD).

Steel 11/11/46; *Item No.* 9934

Rocking Electric Furnace

New type indirect arc rocking electric furnace, directly below, is designed for easy change of shells to permit melting of a variety of ferrous and nonferrous alloys. Manufactured by Detroit Rocking Electric Furnace division of Kuhlman Electric Co., Bay City, Mich., furnace is designated as type LF, and rated at 100 kw, with 200 lb nominal cold charge capacity. In a typical 9-hour day's operation, furnace is capable of melting seventeen 225-lb heats of red brass with an overall energy consumption of 318 kwh per ton.

Steel 11/11/46; *Item No.* 9834



Car Door Opener

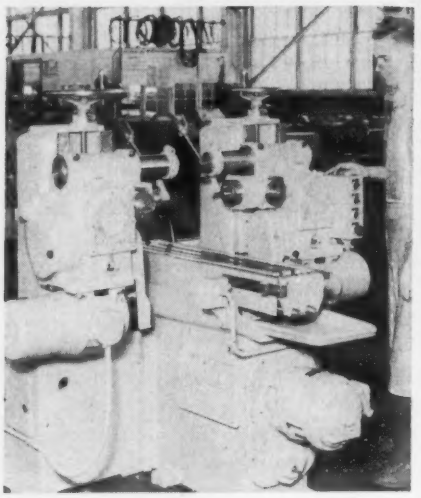
Monarch car door opener, announced by Mining Safety Device Co., Bowerston, O., allows one man to open or close freight car doors quickly and safely. Built for rough handling, its steel case is designed to enclose the locking pawl and eliminates interference with corrugated doors. Case and pawl are of high strength alloy steel. The welded steel chain is treated with a long-life galvanized finish.

Steel 11/11/46; *Item No.* 9725

Milling Machine

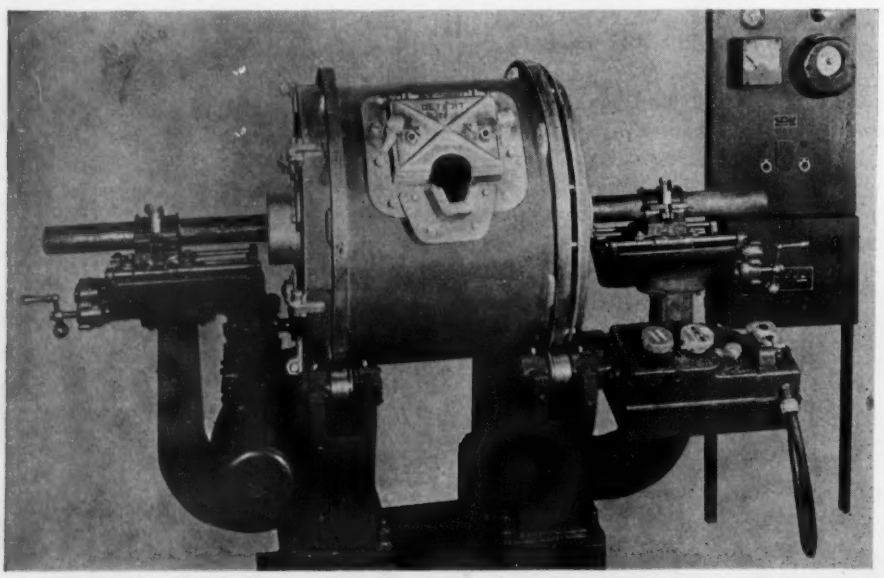
Capable of reducing time and machining costs by milling two surfaces simultaneously, a new milling machine, the No. O Rigmil shown at right above built by Sundstrand Machine Tool Co. of Rockford, Ill., has two horizontal opposed spindle heads that have independent vertical adjustment from 2 to 13 in. With independently driven spindles using either 1 or 1½-hp motors, two speed ranges are available, 25 to 1200 rpm and 50 to 2400 rpm. Three fixed positions for spindle head columns 1¾-in. apart provide a total spread of 7 in. between spindle noses. Table size is 8 x 41½-in., while maximum table feed stroke is 12 in. and rate of table feed is adjustable between ½ and 38 ipm, movements being controlled hydraulically.

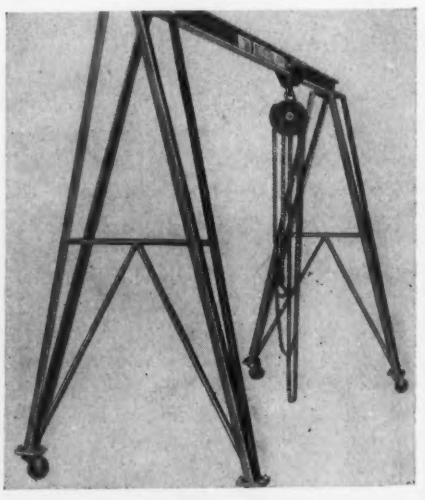
Steel 11/11/46; *Item No.* 9937



Gantry Crane

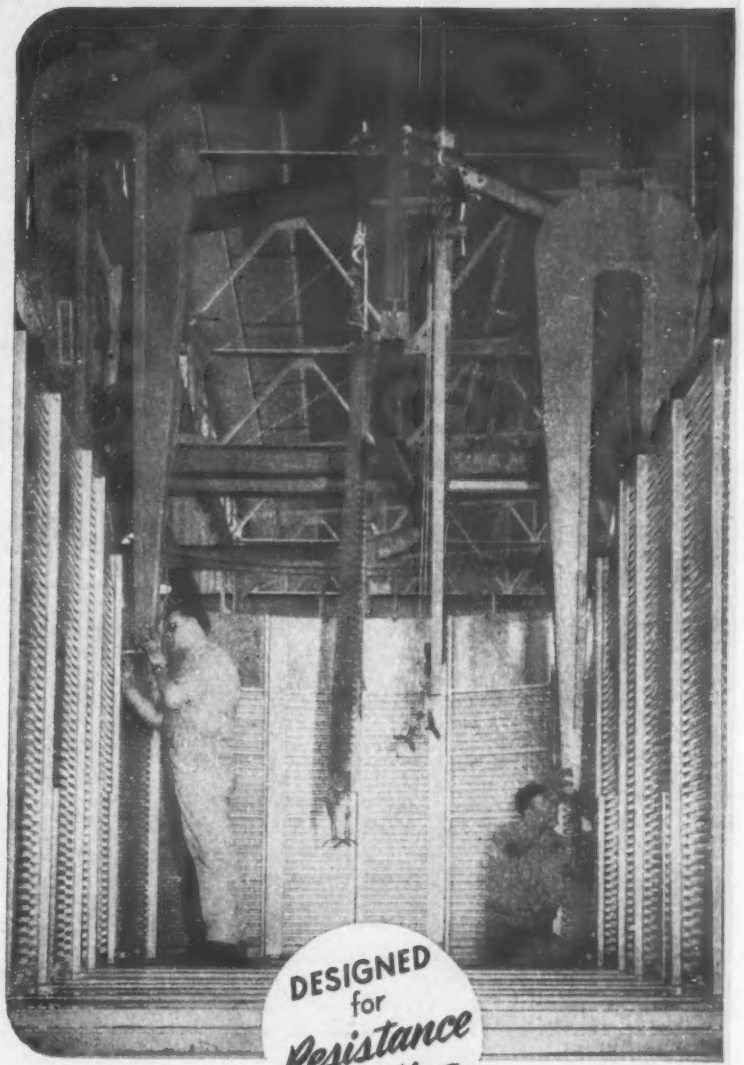
Generous factor of safety is incorporated into the portable gantry crane (directly below) manufactured by Industrial Equipment Co., 315 North Ada street, Chicago 7. Of 1-ton capacity, and featuring ease in handling and flexibility for many services, it can be used on loading platforms and docks, in power plants, machine shops and factories for maintenance or production work. Swivel unit is ball bearing mounted and caster is equipped with ball thrust type bearings.





(All claims are those of respective manufacturers; for additional information fill in and return the coupon on page 188)

There really wasn't any other way to design them—



When Fruehauf designed its now famous stainless steel truck-trailer it went after real mass production: not just a couple of hand assembled trailers a day—but a complete trailer off the line every 45 minutes.

There were two ways to do a job like that. Either Fruehauf could build enormous plants with many assembly lines and use relatively slow equipment—or it could design the trailers for assembling by resistance welding from stem to stern, from roof to undercarriage.

Since the latter enabled Fruehauf to turn out highest quality trailers faster and at lower cost, there wasn't any real question in the end. Every one of these Fruehaufs rolling off the line is doing so through benefit of Progressive welding guns—push guns, scissors guns, C-type guns, little guns and big ones like those shown here.

Progressive's engineers will be glad to help you design your products so that they can be built better, faster and at lower cost with resistance welding.

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Make mounting easier and lose less production time . . . provide longer life with less attention. They are universally adaptable to line shafting and machine installation, dimensionally interchangeable with other standard makes. In straight bore or adapter types. Two or four bolt design. Equipped with the new Shafer "Z"-housing seal that keeps lubricant in and dirt out. Equipped with the famous Shafer self-contained self-aligning DE-22000 Series bearing. They have no equal.

THE SHAFER SOLID PILLOW BLOCKS

in a wide range of sizes and capacities for all classes of service and in pedestal type where additional height between base and shaft center is needed. Rugged and compact housings for the rugged and compact Shafer double row radial thrust roller bearings with integral self-alignment that simplifies designing, machining and installing. Dimensionally interchangeable with other standard makes. Two or four bolt design. Equipped with the new Shafer "Z"-housing seal that keeps lubrication in and dirt out.

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The Shafer self-contained unit has a one-piece outer race, spherical inner race and two roller assemblies. Preadjusted, ready to install on shaft or in housings, to locate machine parts and carry thrust loads. Readily interchangeable with other standard bearings. Generous load capacity, for radial, thrust or any combination of radial thrust loads. Integral self-alignment. Efficient distribution of load with no pinching or binding. Natural positioning rollers assure free rolling action, no end friction.

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The basic Shafer bearing. The fundamental Shafer idea that merges the low rolling friction of a ball and the high load capacity of a roller into a unit that has integral self-alignment, high capacity for radial or thrust loads or any combination of the two, high resistance to shock or impact, simple in construction, easy to adjust. Available in double row as shown above, or in single row, both in a wide range of sizes and capacities.

General dimensions are: Height, 9 ft 11⅝-in., length, 12 ft and width 5 ft 6 in.
Steel 11/11/46; *Item No.* 9936

Angle Square

Precision micro-sine angle square announced by Acro Tool & Die Works, 4554 Broadway, Chicago 40, enables shop men to check right angles quickly and accurately and to check accuracy of work to within 0.0001-in. within a given distance. An indicator shows errors on dial and shows where and how much correction is required.

Square is offered in two types. One has a standard precision gage that is graduated in 0.0001-in. and the other has a lever indicator that reads in 0.001-in.
Steel 11/11/46; *Item No.* 9687

Fly Cutter

Longer service life and ready adaptability are features of universal fly cutter introduced by Wendt-Sonis Co., Hannibal, Mo. Cutter does all kinds of ordinary and step milling operations on all types of materials.

Only one cutter body is needed to handle most milling jobs, since inserted teeth are easily interchangeable. Blades may be removed for sharpening on an ordinary bench grinder.
Steel 11/11/46; *Item No.* 9701

Angle-Dressing Attachment

An angle-true attachment, for use on Waltham cutter sharpener, is now manufactured by Edward Blake Co., 634 Commonwealth avenue, Newton Centre, Mass. Face of dish wheel, used on this machine, is dressed by the standard-equipment diamond. Attachment provides a second diamond for dressing the back and the periphery of the wheel to any desired combination of angles.

Attachment increases the scope of cutter sharpener which sharpens gear and thread milling cutters, circular form tools and multiple cutters from the smallest sizes up to 3½-in. in diameter. It can

be used for either radial or rake grinding and operates either with index plates or with a pawl device which positions cutters.
Steel 11/11/46; *Item No.* 9745

Regulating Valve

New line of single-seated, fully balanced diaphragm regulating valves for process industries and power plants is announced by Leslie Co., 152 Delafield avenue, Lyndhurst, N. J. Valves are made with cast iron, bronze and steel bodies for steam, air or gas pressures up to 1000 psi, and are designed to be actuated by standard pressure or temperature instruments, or controllers using 20 psi air or clean water.

Supplied as standard equipment with 800 brinell hardened stainless steel, main valves and stellited seat rings have advantage of being absolutely tight in dead-end service. For temperature over 450° F, they are equipped with a newly designed cooling bonnet that offers a large radiating surface.

Units designated as Classes D-1 (cast iron or bronze) and DS-1 (steel) are supplied with valve below seat in closed position, opening with diaphragm pressure. By use of a reversing superstructure, valve can be easily changed to a normally open below seat position, closing with diaphragm pressure, without changing internal parts.
Steel 11/11/46; *Item No.* 9729

Welding Head

Improvements of its welding head designed to simplify production installation setups and increase speed of operation, are announced for Lincolnweld hidden-arc process of automatic metallic shielded arc welding by Lincoln Electric Co., Cleveland. Designed as LAF-2, the new head accommodates 3/32-in. electrodes, but also can accommodate electrode wire ranging from ⅛ to 7/32-in.

To start the arc one turns a single control switch to the down weld position, causing electrode to feed down until the end touches the work piece. Short-circuiting wire to the plate automatically causes wire feed motor to stop. Flux valve is turned on and the arc started by means of a pushbutton.

Another feature is use of plugs and receptacles which simplify and reduce installation time for head. Wire straightener makes it easier to insert the starting end of the wire. Process is designed for use with direct current, utilizing a bare metallic electrode which

FOR MORE INFORMATION on the new products and equipment mentioned in this section, fill in this form and return to us. It will receive prompt attention.

Circle numbers below corresponding to those of items in which you are interested:

9934	9756	9697
9834	9678	9742
9725	9739	9754
9937	9705	9714
9936	9703	9904
9687	9728	9580
9701	9724	9726
9745	9702	9720
9729		9731

11-11-46

NAME ..... TITLE .....

COMPANY .....

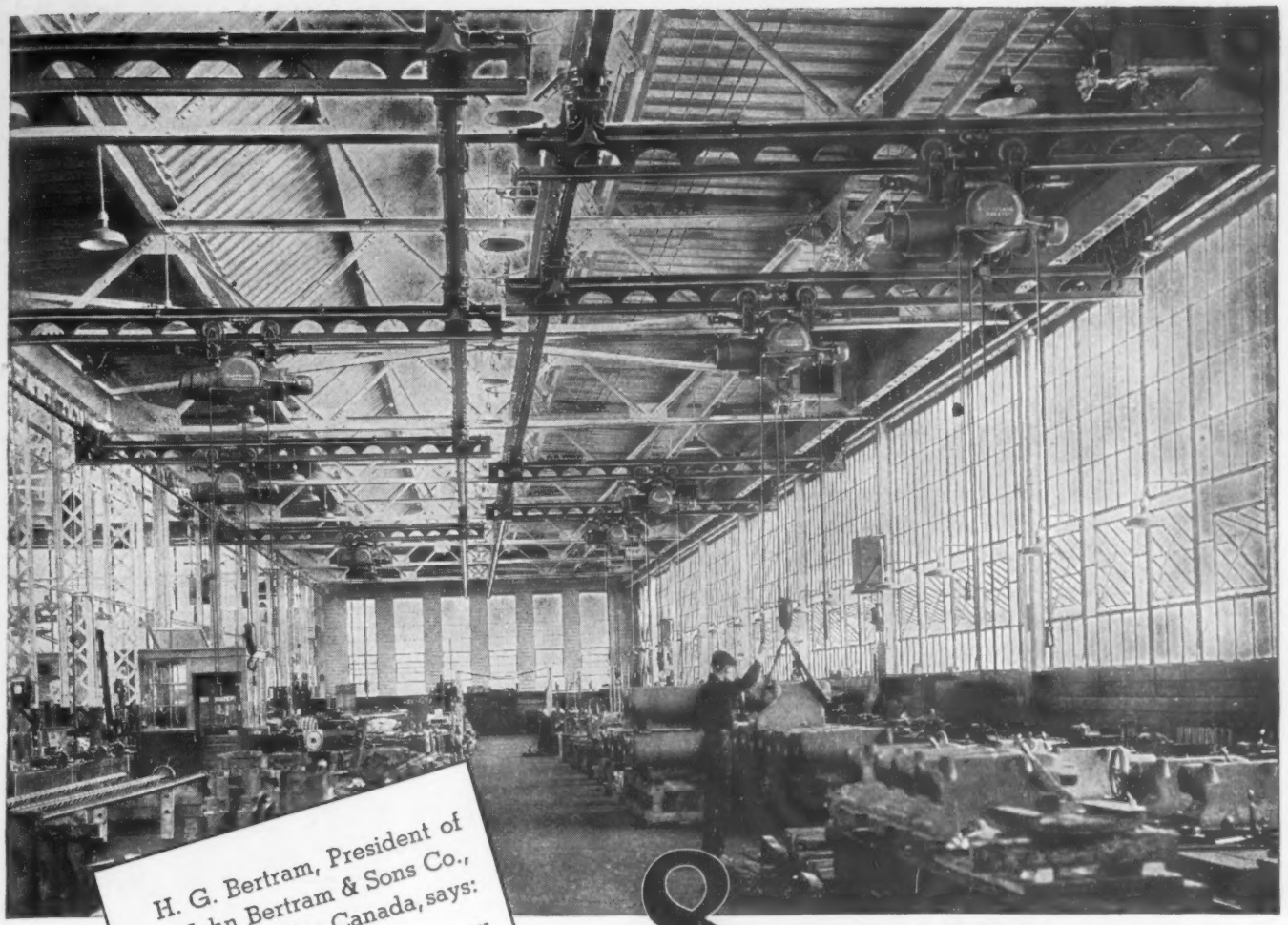
PRODUCTS MADE .....

STREET .....

CITY and ZONE ..... STATE .....

Mail to: STEEL, Engineering Dept.—1213 West Third St., Cleveland 13, Ohio

(All claims are those of respective manufacturers; for additional information fill in and return the coupon on this page.)



H. G. Bertram, President of The John Bertram & Sons Co., Limited, Dundas, Canada, says:

"We have always been very pleased with the installation we made and it has very considerably assisted our war work.

"The front bay with the eight cranes is the ideal layout for small shop work."

NOTE: The John Bertram & Sons Co., Limited, has long had a reputation of being one of the largest and foremost builders of fine precision machine-tools in Canada.

8 CRANES . . . . IN ONE SHOP BAY

To secure maximum crane service in the unit assembly department, The John Bertram & Sons Co., Limited, Dundas, Ontario, have installed two parallel runways with four cranes on each. This installation provides crane facilities for double the number of workers possible with conventional wall-to-wall cranes. Though not interlocking, the cranes may easily be so arranged.

Thus considerable time usually spent by costly, skilled mechanics waiting for crane service is greatly reduced and production speeded. This is another of the manifold ways that Cleveland Tramrail equipment can be used to advantage.

GET THIS BOOK!

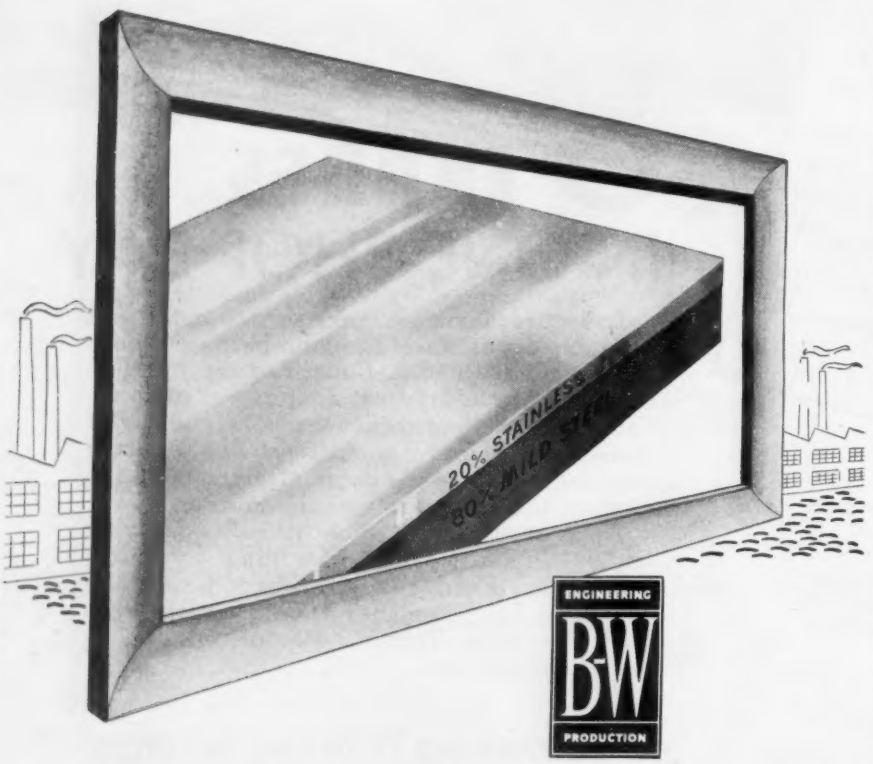
BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy.

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
1125 EAST 283RD ST. WICKLIFFE, OHIO.

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

How does INGACLAD fit into your picture?

Look around your plant . . . at your products . . . at your equipment. Wherever stainless steel protection is needed only on the exposed or contact side, *there* is where IngAclad Stainless-Clad Steel fits into your picture. Because IngAclad is 20% solid stainless steel, permanently bonded to a backing of mild steel, it provides all the stainless steel protection you need—for far less than the cost of solid stainless. Doesn't *that* fit into your picture?



INGACLAD
STAINLESS-CLAD STEEL

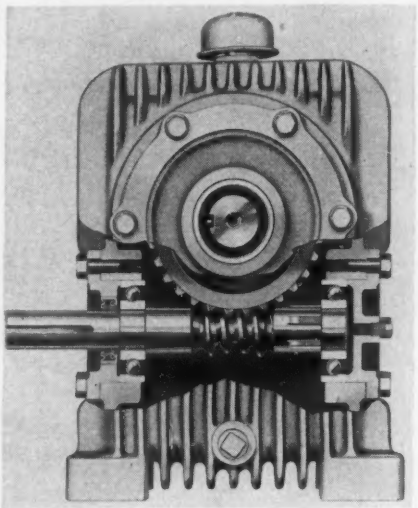
INGERSOLL *Steel Division* • **BORG-WARNER CORPORATION**
310 S. MICHIGAN AVE., CHICAGO 4, ILLINOIS
PLANTS: *Chicago, Illinois* • *New Castle, Indiana* • *Kalamazoo, Michigan*

is fed through a granular flux deposited on the joint to be welded. Sufficient flux is applied to cover arc and molten metal.

Steel 11/11/46; *Item No.* 9756

Speed Reducer

Standardized line of compact speed reducers, built around double enveloping Cone-drive gearing is announced by Michigan Tool Co., 7171 East McNichols road, Detroit 12. These units, in various models to suit various requirements, have a greater load carrying capacity because



of more teeth in contact and more contact per tooth. As a result, smaller gears can be used to transmit a given load, resulting in more compact housing.

Standardized line includes models with pinion under, pinion over, and with gear shaft vertical. Center distances of from 2 to 18 in. cover a power-transmission range equivalent to 3 to 24 in. center distance in worm gearing. Horsepower rating range up to 800 hp. Available ratios range from 5:1 to 70:1.

Steel 11/11/46; *Item No.* 9678

Broach Machine

Five sizes of new style type XP vertical pull-down broaching machines, varying in normal pulling capacity from 5 to 37½ tons and broaching strokes from 24 to 66 in., are being offered by Oilgear Co., 1301 Bruce street, Milwaukee 4.

Features of machines are automatic tool handling mechanisms with adjustable bracket for tools of varying lengths; dual safety pushbutton control with selector switch for manual or semicycle operation; regenerative stabilizing circuit; and interlocked operation of tool handling carriage and tool pulling slide. Pressure lubrication of tool slide, carriage and ways is automatic.

Each machine is equipped with a

5 Different Types And They're All . . . Hy-Draulic

Whatever you may require of your shaper or planer equipment, there's a Rockford Hy-Draulic machine tool to meet your needs. Because Rockford machines are Hy-Draulic they offer many important advantages in easier operation, speed, quality of work, and low overall costs. Rockford Hy-Draulic planers and shapers are built in a wide range of sizes and in five basic types.

1 RAM-TYPE SHAPERS . . . available in rated stroke sizes of 12″, 16″, 20″, 24″, and 28″. A special 24″ machine is also built with non-standard table specifications for specialized work.

2 OPENSIDE SHAPER . . . built in 36″ table stroke size. Provides shaper speeds and rigid mounting for tool.

3 SLOTTERS . . . Ram assembly may be set in a tilted plane up to 10° off-vertical. Table provides longitudinal, transverse and rotary feed. Built in 12″, 20″ and 36″ rated stroke sizes.

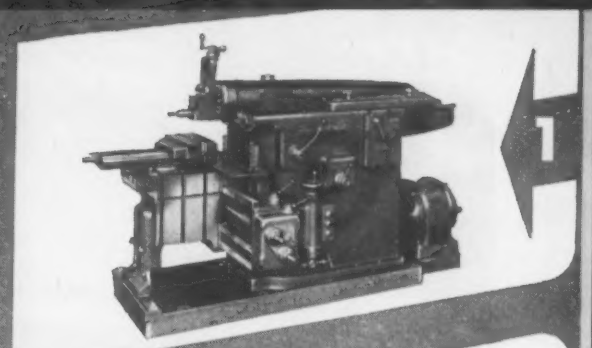
4 SHAPER-PLANERS . . . of practical use in a wide range of applications where smaller-type planer work must be done. Built in stroke sizes of 42″, 66″, 90″, 120″, and 144″.

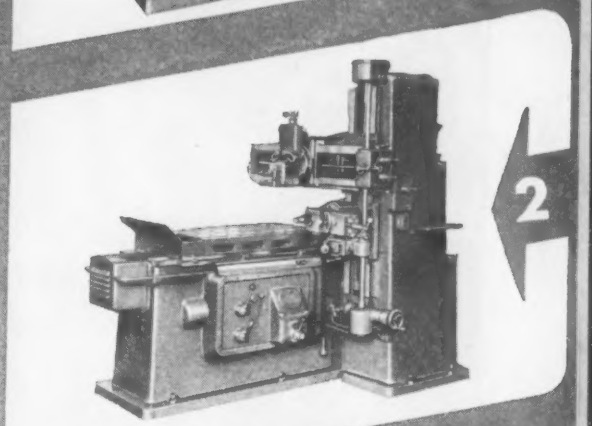
5 PLANERS . . . Double-Housing and Openside . . . each type built in four rated sizes from 36″x 36″ to 60″x60″; maximum stroke lengths of 10, 12, 14, 16, 18, or 20 feet available in each size.

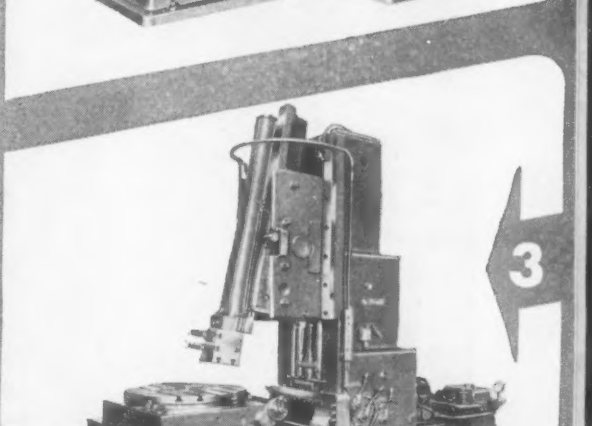
Information on all Rockford Hy-Draulic machine tools will be sent promptly upon request. Write for Catalog 1946 . . . your inquiry is invited.

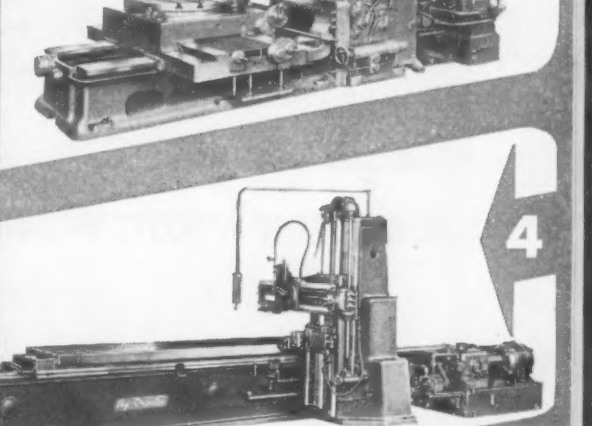
ROCKFORD MACHINE TOOL CO.
Rockford Illinois

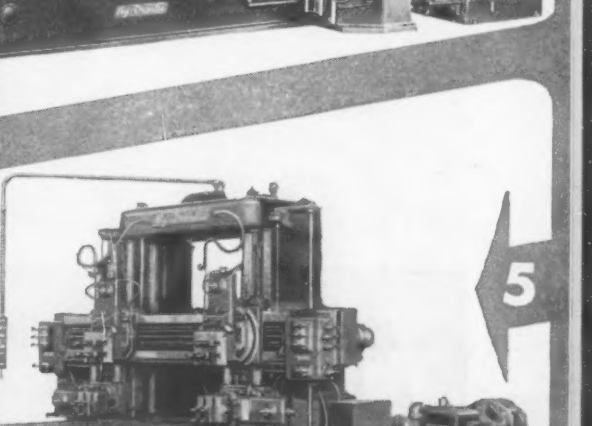
4612



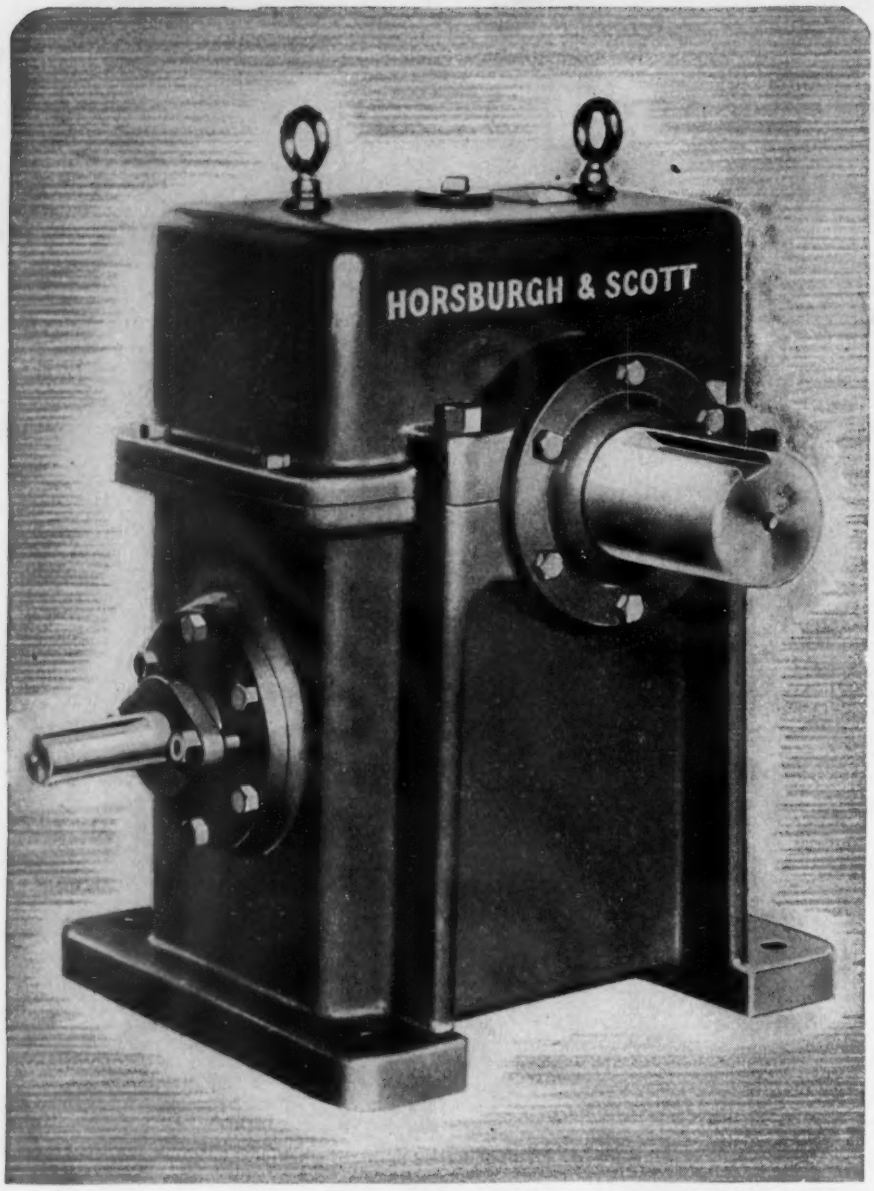








Hy-Draulic



HORSBURGH & SCOTT WORM GEAR SPEED REDUCERS

Are

Extremely Simple in Design ★ Compact ★ Efficient ★ Strong

Assuring

Quiet Operation ★ Low Maintenance ★ Long Life

Available In

8 TYPES . . . Reductions from 3⅝ to 1 up to 10,000 to 1

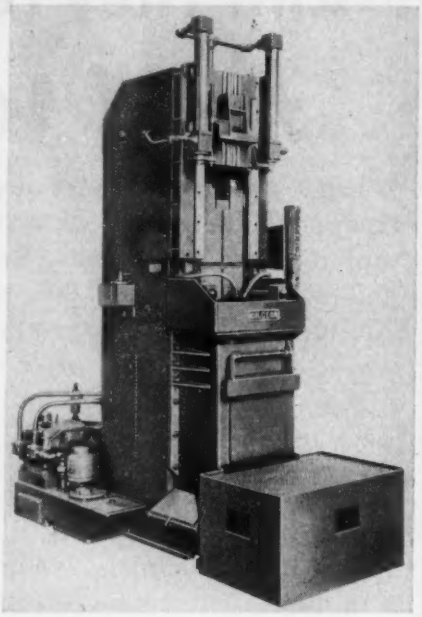
Send note on Company Letterhead for Speed Reducer Catalog 39

THE HORSBURGH & SCOTT CO.

GEARS AND SPEED REDUCERS

5112 HAMILTON AVENUE • CLEVELAND, OHIO, U. S. A.

two-way variable radial piston fluid power pump arranged for direct drive and of sufficient capacity to provide variable broaching speeds up to 30 fpm and independently varible return speeds up to



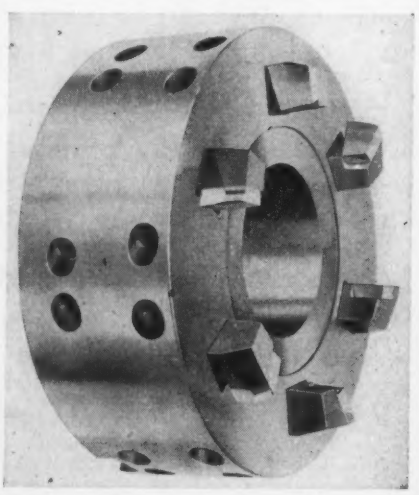
80 fpm. Machines will pull peak loads up to 150 per cent of normal capacity.

When broaching, operator merely loads and unloads work and depresses the simple dual safety pushbutton control.

Steel 11/11/46; *Item No.* 9739

Face Mill

Lovejoy Tool Co., Springfield, Vt., announces a new face mill called Cutsall, a tool-bit-type mill with cemented tungsten carbide blades. Housing is built to



take either left or right-hand blades, holding the blade face slightly back of center so positive and negative radial rake can be obtained from the same blades.

Blades have extra large carbide tips and can be sharpened on an off-hand, adjustable table single-point tool grinder. The mill is capable of making heavy cuts

PRODUCTS *plus* SERVICE

Perfect equals Metal Cleaning

That equations must balance is a fundamental law of mathematics. A fundamental law in metal cleaning says that best results come only from a combination of products and service. Detrex Corporation adds these elements together offering the metal industry efficient, economical answers to its cleaning problems.

THE PRODUCTS FOR SOLVENT DEGREASING . . .

Possessing the stability necessary for the solvent-vapor degreasing of all metals, **PERM-A-CLOR** is right wherever tough operating conditions are encountered. Its running mate, **TRIAD**, is recommended for degreasing straight ferrous products. Detrex standard degreasers combine desired cleaning phases in machine sizes ranging from huge automatic installations to small manually-operated units.

. . . AND ALKALI AND EMULSION PARTS CLEANING . . .

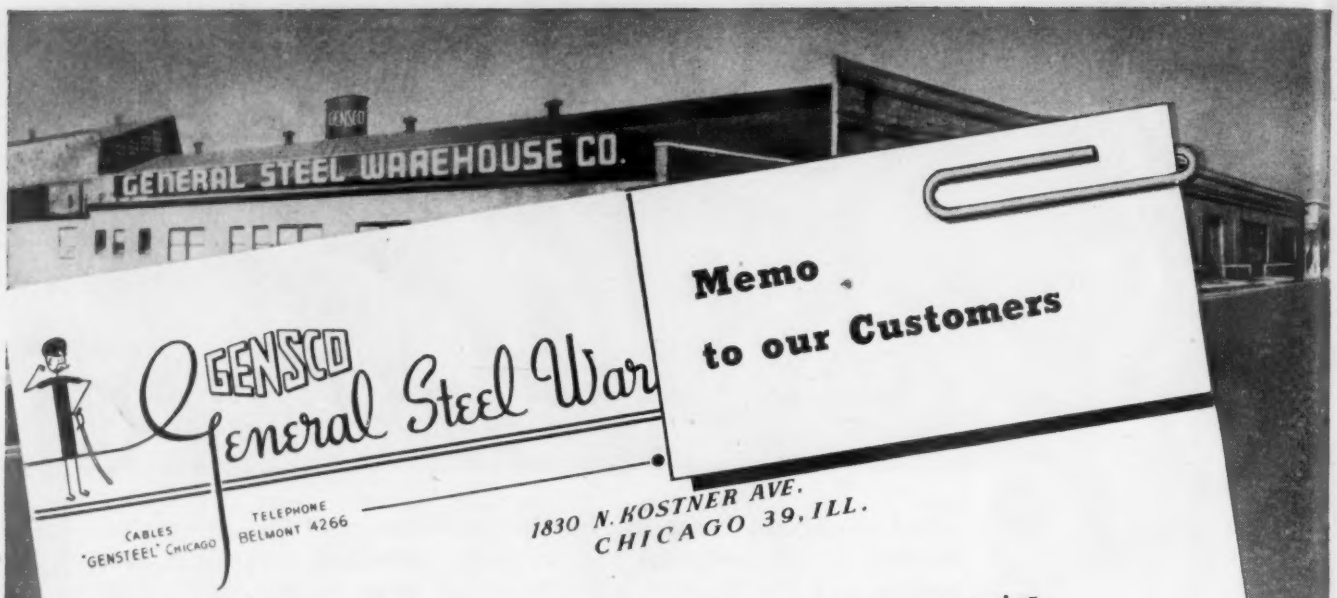
DETREX TRIAD ALKALIS AND EMULSIONS are compounded under rigid control for specific cleaning jobs—soak, spray, stripping, electrolytic, paint spray booth and many others. Metal parts washers, fabricated by Detrex, are available in single- or multiple-spray zone standard models. When dry work is required, hot or cold pressure dry-off stages are supplied.

. . . COMBINED WITH SERVICE

Service is a part of each Detrex field representative's job. Not only does he make actual periodic inspections of your equipment, but he also trains your operators and maintenance men in economical cleaning practices. Your production is his problem. ***Call him today.***

DETREX Corporation

DETROIT 32, MICHIGAN



GENSCO
General Steel War

CABLES "GENSTEEL" CHICAGO

TELEPHONE BELMONT 4266

1830 N. KOSTNER AVE.
CHICAGO 39, ILL.

Memo
to our Customers

In normal times Gensco supplies hundreds of companies with all of their steel requirements . . . today, of course, demand far exceeds the supply. Gensco representatives frequently lend their helpful assistance by suggesting the use of alternate steels which, in many cases prove to be practical or even better suited than the steels normally used in your operations. Ask them to assist you.

If we cannot supply the desired steel it is quite possible, as in the case of many of our customers, that you may have steel in your plant which is not processed in usable shapes for economical production.

Let the Gensco man in your territory explain how this steel may be converted into usable widths, lengths and edges at Gensco.

COLD ROLLED STRIP STEEL • COILS AND STRAIGHT LENGTHS • SHEET STEEL
COLD FINISHED BARS • SHAFTING • ROUND EDGE FLAT WIRE
ROUND WIRES • TEMPERED AND ANNEALED SPRING STEEL
SHIM STEEL • FEELER GAUGE • DRILL ROD • STEEL BALLS

GENERAL STEEL WAREHOUSE CO., INC.

1830 North Kostner Avenue, Chicago 39, Illinois • Belmont 4266

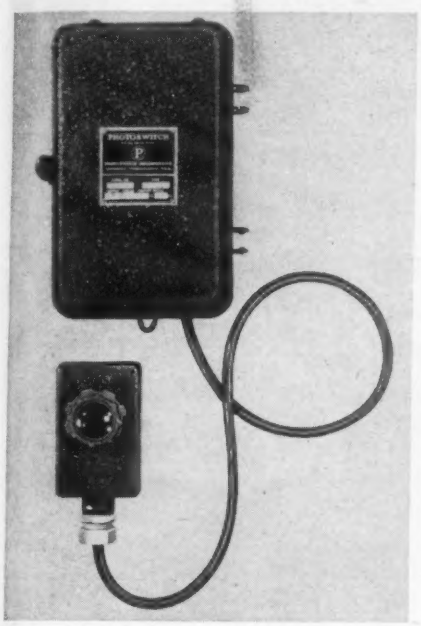
New York 17	Cincinnati 17	Milwaukee 2	St. Louis 5	Minneapolis 11
441 Lexington Ave.	56 E. Mitchell Ave.	208 E. Wisconsin Ave.	9301 Bonhomme Rd.	100-17th Ave., North
Vanderbilt 6-2750	Plaza 1470	Broadway 7629	Wydown 1368	Cherry 4457

in tough stock at high spindle speeds. It is manufactured in 6, 8, 10, and 12-in. diameter sizes.

Steel 11/11/46; *Item No.* 9705

Photoelectric Control

Series 20 and 21 photoelectric controls built by Photoswitch Inc., 77 Broadway, Cambridge 42, Mass., are designed for general industrial and machinery application. They are particularly suitable for



such applications as counting, conveyor control, short-range motor or valve control, production inspection, machinery safeguards and stop-motion control.

Phototube of the equipment is available either integral with housing or in a small separate housing. A tamper-proof sensitivity adjustment is provided on control housing to permit operation over varying distances between phototube and light source. Hermetically-sealed, oil-filled condensers and high wattage resistors also are incorporated.

Steel 11/11/46; *Item No.* 9703

Threading Tool

A new hand tool developed by Thread Miller Corp., West Orange, N. J., permits threading and tapping at high speeds in a lathe with perfect safety to tools and operator. Known as Grip-Slide threading and tapping tool, it eliminates hazard of projecting tap or die holder handles. It also can be used for cutting either right or left hand threads.

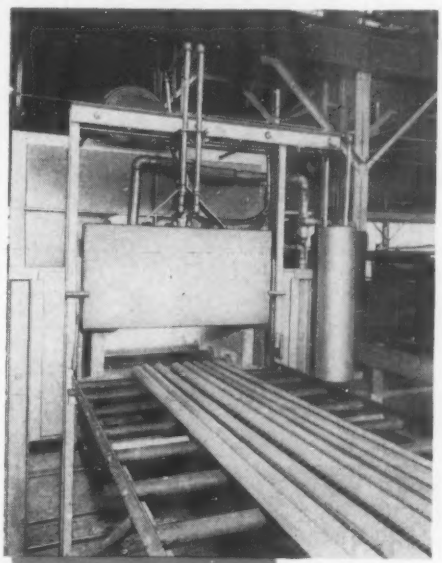
Tool eliminates necessity for moving tailstock back and forth when threading or tapping work in lathe. Sliding movement of die or tap holder takes place on a guide bar concentrically true with the tapered shank that fits into tailstock

TWO NEW DEVELOPMENTS

OFFERED TO INDUSTRIAL FURNACE USERS:

1: *Refractory Radiant Heating Tubes*

2: *Refractory Hearth Rollers*



Research has developed CARBOFRAX* rollers and CARBOFRAX combustion tubes for high temperature radiant heated roller hearth type industrial furnaces. Refractory rollers and tubes engineered in GASMACO furnaces insure long-lived equipment in the higher temperature heat treating field.

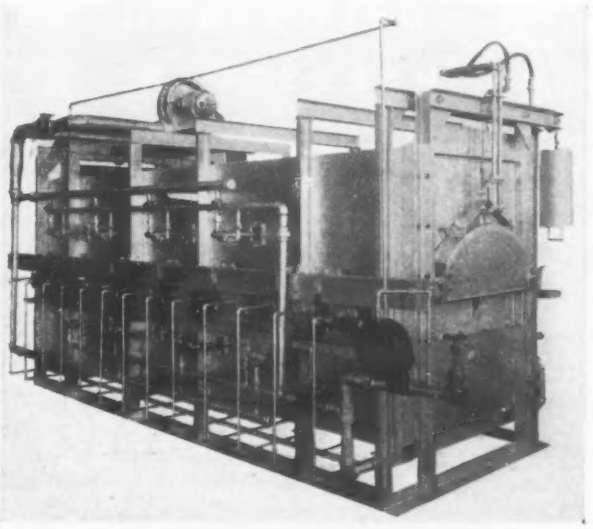
2500° operating temperatures may be obtained without detrimental effect to the refractory tubes and rollers. Heavier roller loading can be attained and still convey the work through the furnace by batch, by indexing, or continuously. Investigate these developments for solution to your high temperature heating problems. Write, phone or wire for full particulars.

DESIGNERS & FABRICATORS of ALL TYPES of INDUSTRIAL HEATING & HANDLING EQUIPMENT

★

PATENTS APPLIED FOR

*Note: CARBOFRAX is a registered trade mark which indicates manufacture by the Carborundum Co.



Our engineers are available at any time to aid you with your furnace problems

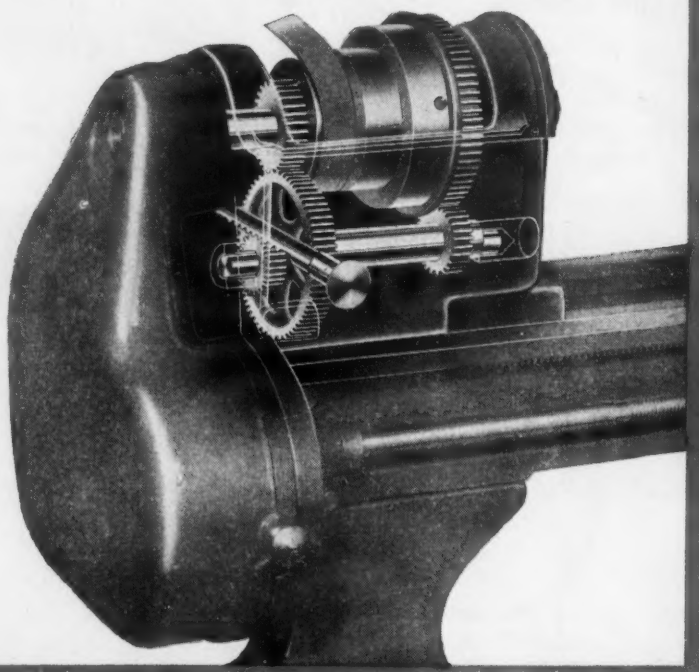
THE GAS MACHINERY CO.

16100 WATERLOO ROAD · TELEPHONE: KEnmore 1130

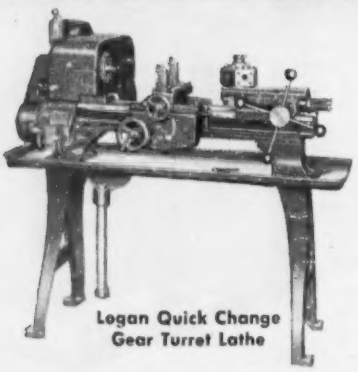
CLEVELAND 10, OHIO

Logan A NAME TO REMEMBER WHEN YOU THINK OF **BETTER** LATHES

Finger Tip Control for Safety, Ease and Speed in Shifting Back Gears



BACK GEARS ENCLOSED IN HEADSTOCK



Logan Quick Change Gear Turret Lathe

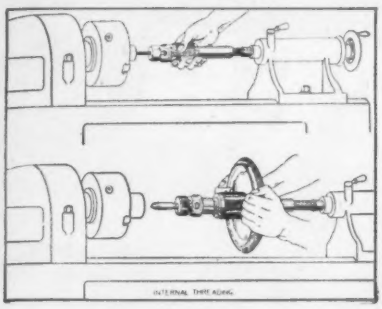
SPECIFICATIONS COMMON TO ALL LOGAN LATHES . . . swing over bed, 10½" . . . . bed length, 43⅛" . . . . size of hole through spindle, 25/32" . . . spindle nose diameter and threads per inch, 1½" — 8 . . . 12 spindle speeds, 30 to 1450 rpm . . . motor, ½ hp, 1750 rpm . . . ball bearing spindle mounting . . . drum type reversing motor switch and cord . . . precision ground ways, 2 V-ways and 2 flat ways.

PLUS PATENTED SHIFTER RACK INCREASES SAFETY AND EFFICIENCY, ADDS TO APPEARANCE OF LOGAN LATHES

Logan advanced design not only encloses back gears in the headstock, it also places the complete control of these gears at the operator's finger tips. In the above illustration, note how the patented Logan Shifter Rack is located on the front side of the headstock. That means there is no need to reach over the headstock, or to lean forward close to the work or moving parts in order to pull a lever that shifts power to or from the back gears. Thus, the operator not only avoids risk of injury, he also makes the shift more easily and quickly. In addition, this location of the shifter rack adds to the trim, clean cut appearance of Logan Lathes. It is another example of the practical engineering which is combined with careful construction and quality materials to make Logan "a name to remember when you think of *better* lathes." For full information, see your nearby Logan Lathe dealer, or write direct for a catalog.

LOGAN ENGINEERING CO. CHICAGO 30, ILLINOIS

spindle. For holding taps in alignment, chuck is furnished which provides a drive by gripping square on end of tap in addi-



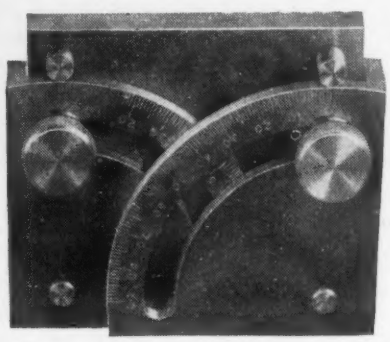
tion to securely holding the tap shank.

Tool is furnished in two sizes, the regular for use in bench and small engine lathes, and giant for use in larger lathes.

Steel 11/11/46; *Item No.* 9728

Angle Protractor

Universal angle protractor, announced by Willey's Carbide Tool Co., 1340 West Vernor highway, Detroit 1, can be used on all makes of carbide tool grinders, and provides a dual change of angles from 0 to 90 degrees. This flexibility



permits grinding of two tools simultaneously, at the same or different angles.

Protractor, while designed primarily for grinding applications, also lends itself to a variety of operations, such as acting as an angular guide for drilling, grooving and milling. Key is a separate unit which is studded to body of adaptor and slides on four steel balls.

Steel 11/11/46; *Item No.* 9724

Pattern Plate

A new type of pattern plate, known as master cast and ground flat aluminum Tuff-Plate, is announced by Kindt-Collins Co., 12651 Elmwood avenue, Cleveland 11. Group of tough knurled steel inserts which are cast integrally into each plate, reduce the wear by flasks to a minimum.

Inserts are positioned around outside perimeter of plate to effectively distribute and equalize wear at flask contact points. Surface of the plate is ma-

"Our 11 BAKER TRUCKS *have given us* CONTINUOUS 24-HOUR SERVICE for 4 YEARS"

CASE HISTORY OF THE THOMPSON AIRCRAFT PRODUCTS COMPANY

Routine periodic inspection and lubrication pays substantial dividends in the operation of Baker Trucks at Thompson Aircraft Products Company's mammoth new Cleveland plant.

Here is a good example of what can be expected of Baker Trucks in the way of *continuous operation*, when properly cared for. According to N. J. Shibley, Superintendent of Building and Property Maintenance at Thompson, their Baker Crane Truck and ten Baker Fork Trucks are as good as new after serving three shifts per day for nearly four years —the equivalent of 12 years of normal service. No truck has been overhauled, there have been only a few minor mechanical failures, and maintenance has been almost negligible.

Actual time out of service averages less than ½ hour per day, per truck, divided as follows:

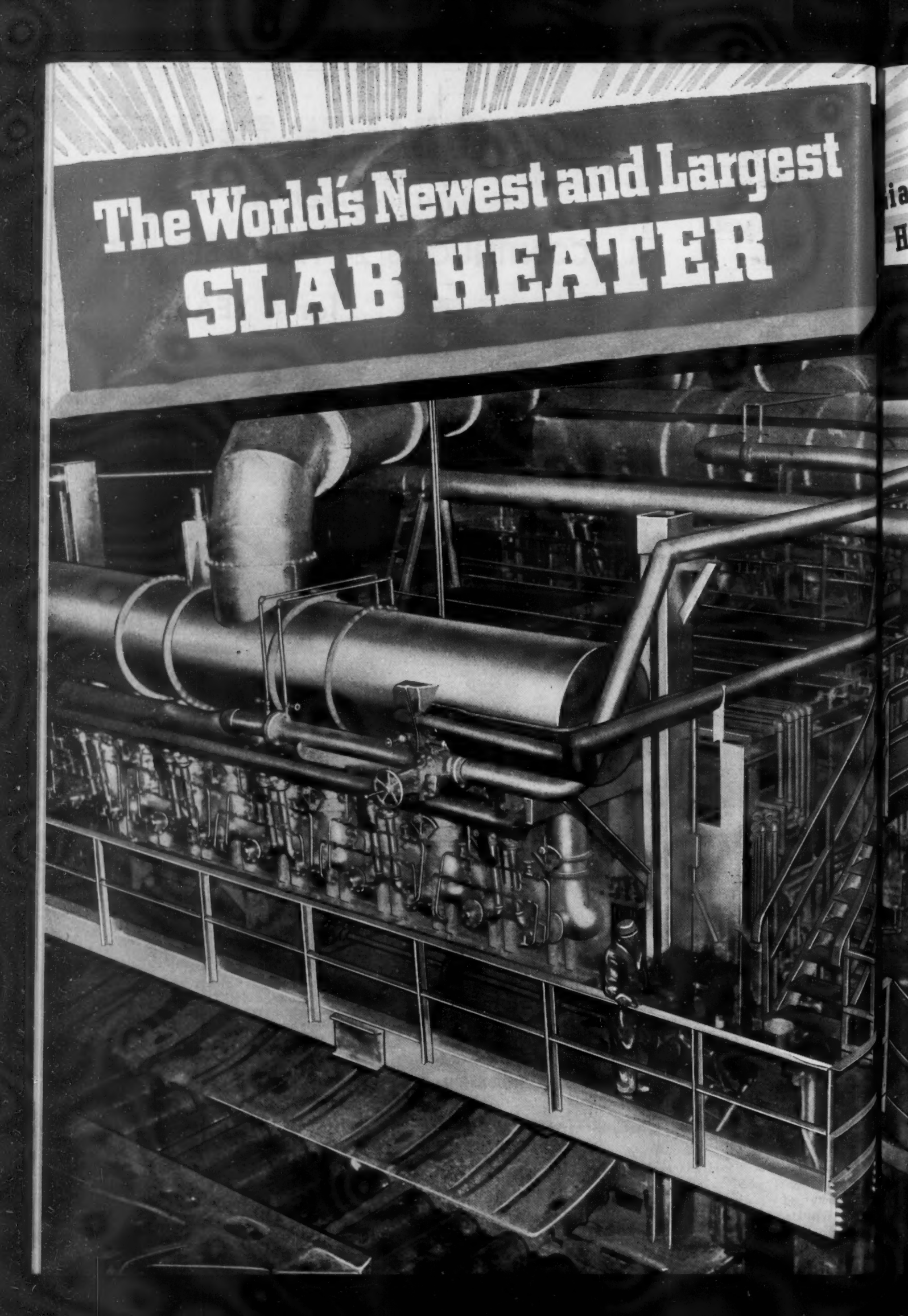
Daily check of Hydraulic System	**5 min.**
Battery changes (2 min. each shift)	**6 min.**
Weekly lubrication (45 min.)—per day . . .	**7 min.**
Other maintenance (Tires, brakes, inspection and adjustment of electrical controls, etc.) 45 hours per month for 11 trucks—per day	**10 min.**
Total .	**28 min.**

Except for the above and for a ten minute period between shifts when trucks are idle, they have been giving "round-the-clock" service for four years and, says Mr. Shibley, "if we continue to take good care of them, they should last indefinitely." That's *Continuity!*

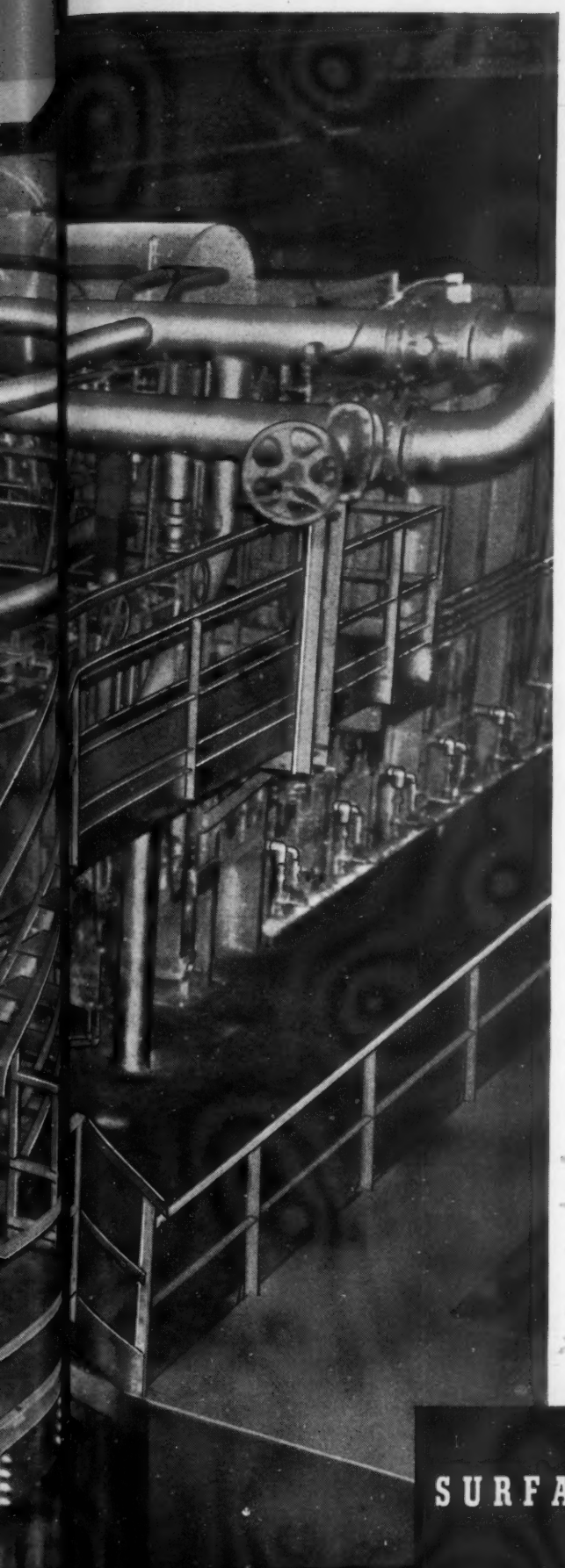
To help you keep your Baker trucks operating continuously and to insure long life, write for "Industrial Truck Care Pays You Dividends."

BAKER INDUSTRIAL TRUCK DIVISION *of The Baker-Raulang Company*
2167 West 25th Street • Cleveland, Ohio
In Canada: Railway and Power Engineering Corporation, Ltd.

Baker INDUSTRIAL TRUCKS


The World's Newest and Largest
SLAB HEATER

...iant Slabs of Steel, Weighing Over 3 Tons Each are, Heated at a Production Rate up to 280,000 Pounds per Hour.



IN the initial processing of coiled strip steel, used for tin plating, huge steel slabs, 150 in. x 42 in. x 5½ in., and weighing approximately 6200 pounds each, emerge from this Surface Combustion Slab Heating Furnace, the newest and largest in the world, installed in the plant of Weirton Steel Company, Weirton, W. Va.

This furnace is 94' 9" in length and the width is 28' 0". It is of the recuperative type and has a "Tripled-Fired" burner arrangement of Surface Combustion design.

Here is another outstanding example of 'Surface' engineering, manufacturing and installation of modern heating and heat treating equipment in the steel producing industry. Other equipment includes One-Way Fired Soaking Pits—Billet Reheating Furnaces—Continuous Heat Treating Furnaces for Plate—Pit Type Convection Furnace for Annealing Rod Wire and Strip in coils—Continuous Strip Annealers and Normalizers—High Alloy Rod and Bar, Atmosphere Annealing Furnaces of Car-Bottom, Lift-Cover Type—Bright Annealing and Normalizing Furnaces for Tubing—Stress Relief Furnaces—Wire Patenting Furnaces—Annealing Covers, and the foremost equipment in Prepared Gas Atmosphere Generators for practically every heat treating operation.

We will welcome the opportunity of working with you on your heating and heat treating problems.

'Surface'

SURFACE COMBUSTION CORPORATION

TOLEDO 1, OHIO

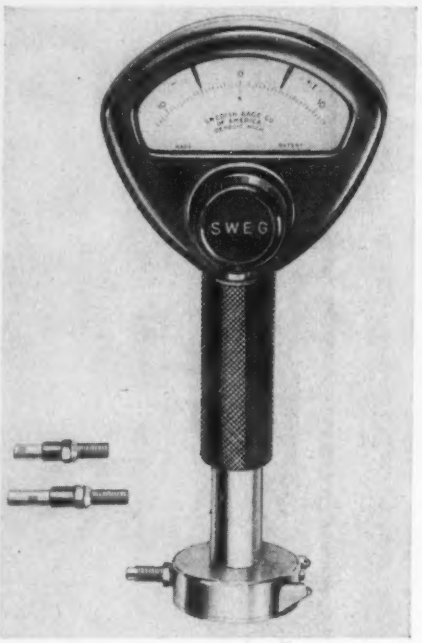
chined to prevent sand slippage. Plate is accurately ground to a plus or minus 0.003-in.

A 1-in. allowance all around the plate is made for flask strip. Three-inch standard ears at each end accommodates all types of flask-pin guides.

Steel 11/11/46; *Item No.* 9702

Internal Indicator

A rapid, sensitive and compact indicator for measuring bore diameters from 13/16 to 6 in. is the Mikro-Internal indicator manufactured by Swedish Gage Co., 8900 Alpine avenue, Detroit 4. It



checks out-of-round and tapers as well as diameters.

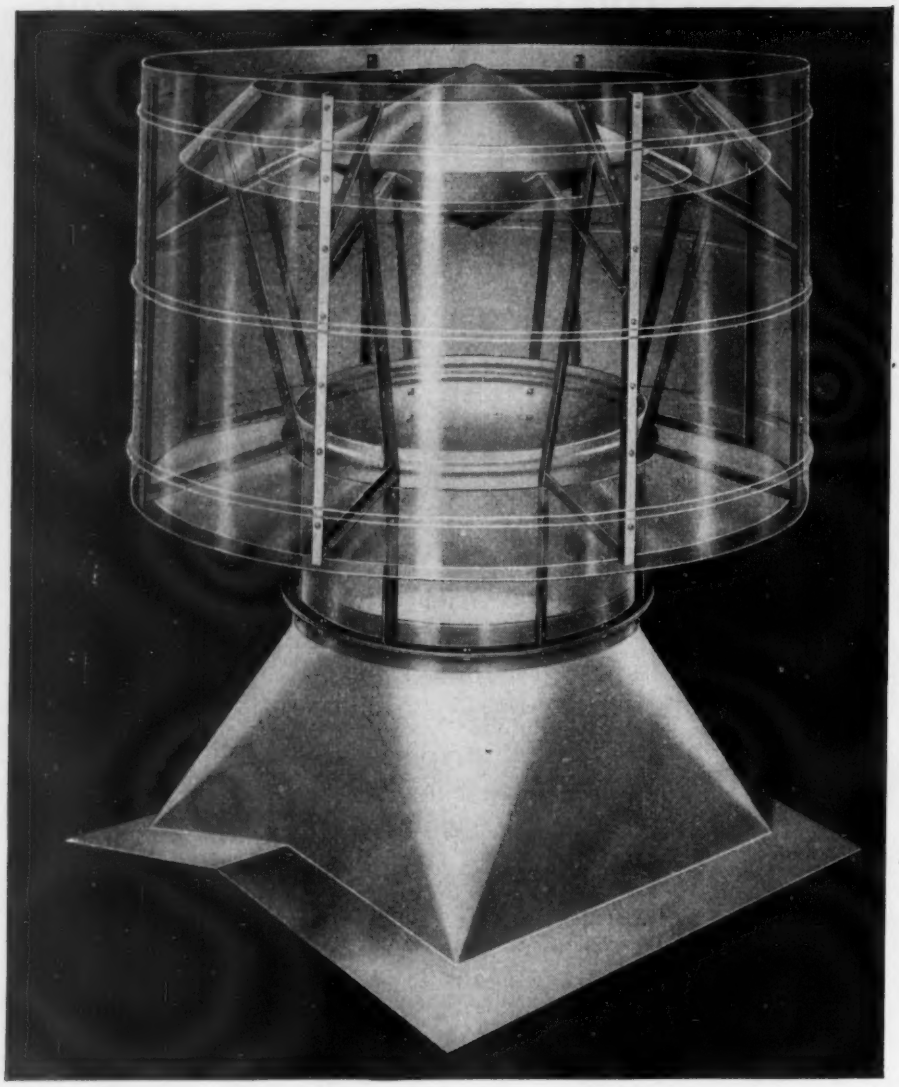
Dial is graduated in 0.0001-in. with a scale range of 0.006-in. Closer tolerances may be checked with another model having a scale range of 0.0024-in. graduated in 0.00005-in. Maximum measuring depth is 4 in.

Steel 11/11/46; *Item No.* 9697

Pipe Threader

Quick-setting workholder and new balanced loop handles are incorporated in the 4P geared pipe threader announced by Ridge Tool Co., Elyria, O. The workholder enables worker to set the threader exactly to size before being placed on the pipe. Once on the pipe only one screw needs to be tightened to hold it securely.

Balanced loop handles on enclosed gear case prevent slipping or tipping. Economy of operation is made possible by twin-anchored drive shaft that turns in oil-less bronze bearing. Threader is provided with four sets of five high-speeded steel dies to cut clean threads,



The BURT Free-Flow Gravity Ventilator Does a Tremendous Air-Moving Job, because—

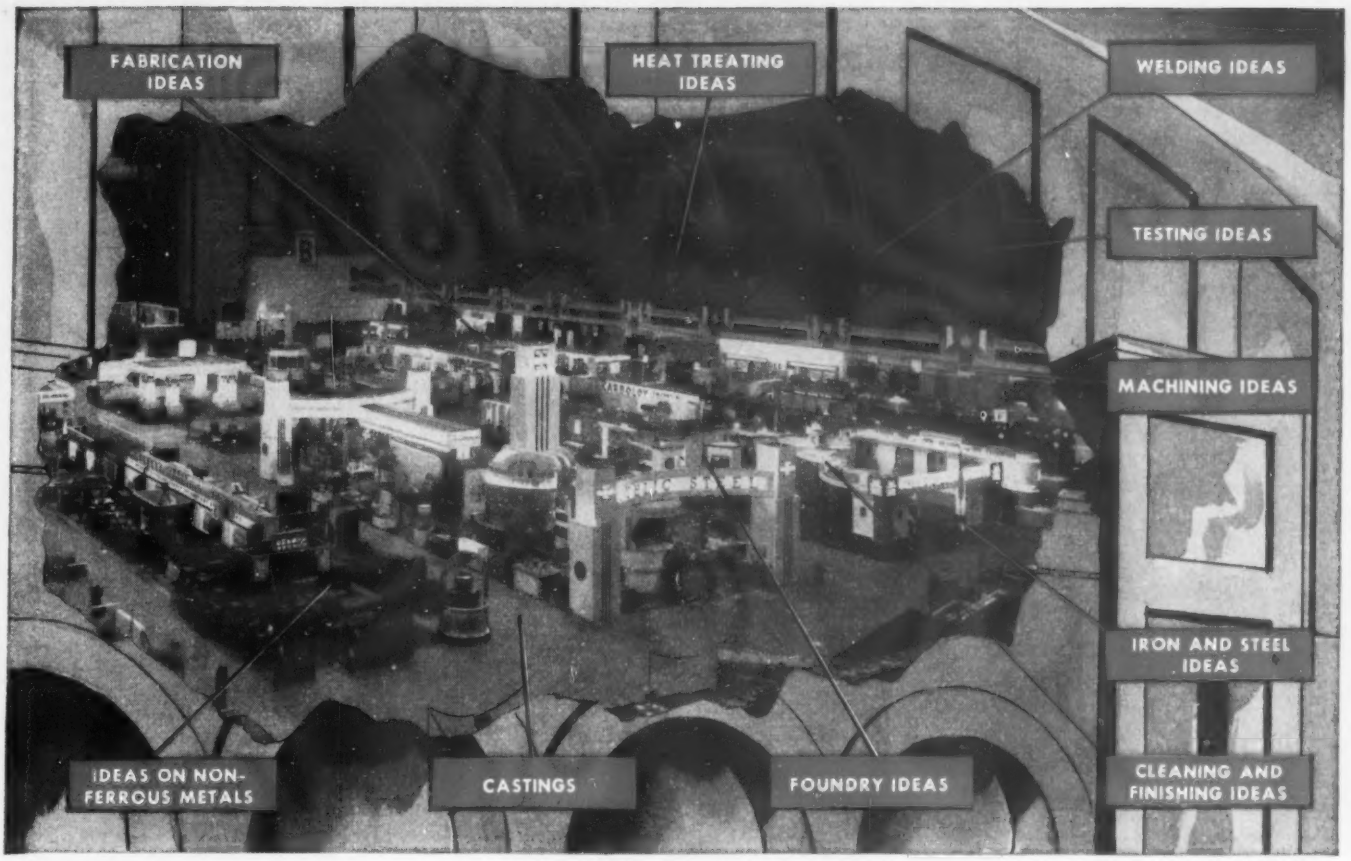
Its design reduces to a minimum the factors that limit the capacity of stationary ventilators. Among its features is upward vertical discharge to eliminate reduction of velocity of discharge and to protect the roof from condensation of moisture directly beneath the ventilator. . . Absence of internal louvers that block discharge and reduce capacity. . . An airflow direction cone that eliminates the trap caused by the conventional ventilator top and prevents turbulence in the head. . . Unusually large windband that creates a far greater low pressure area with a suction effect from passing winds to greatly increase capacity of the unit. . . Larger, heavier braces to withstand extremely high wind velocities. . . And no moving parts to ever get out of order. For complete details see Sweet's or write for catalog and data sheets.

WRITE FOR CATALOGS AND DATA SHEETS

The **BURT MFG.** *Co.*

905 S. High Street Akron 11, Ohio, U. S. A.

MANUFACTURERS OF VENTILATORS, LOUVERS
OIL FILTERS AND SHEET METAL SPECIALTIES



FIND THESE *PRODUCTION* IDEAS AT THE METAL SHOW

MUNICIPAL AUDITORIUM, ATLANTIC CITY, NOVEMBER 18-22

We're taking the lid off to give you a glimpse of what awaits you at the big National Metal Congress and Exposition, Atlantic City Municipal Auditorium, November 18 - 22.

More than 300 of the nation's leading manufacturers are concentrating their latest equipment and processes — many in actual operation — in the vast Auditorium and Exhibit Hall. Here will be your convenient opportunity to see exhibits featuring metals and equipment and processes for their welding, forming, casting, cutting, machining, heat treating, cleaning, plating, testing and inspection.

Here you will hear the production ideas developed by other outstanding metal experts from all the United States and Canada. During daily sessions of the Metal Congress sponsored by four great national societies, you may discuss research papers developed by hundreds of outstanding authorities. More than 100 technical and practical papers will be presented, covering all phases of metal industry operations.

Spend all or part of the week of November 18 — to your own very good advantage — in Atlantic City. Find the production ideas you need at this big 28th Congress and Exposition. You may secure hotel accommodations by wiring the Housing Bureau, 16 Central Pier, Atlantic City.

NATIONAL METAL CONGRESS AND EXPOSITION

Sponsored by the American Society for Metals in cooperation with

The American Welding Society . . . The Iron and Steel and Institute of Metals Divisions of the American Institute of Mining and Metallurgical Engineers . . . American Industrial Radium and X-Ray Society.

canceling "kinks" with
KONDOR DRAW

Material—20 gauge cold rolled strip.
Operation—Blanked and drawn, single operation.
Trouble—Pickup causing excessive scratching and scarfing, also attendant wrinkling.

ANALYSIS OF TROUBLE—Although only a few parts had been run off, enough metal had been picked up by the dies to score the work badly on this comparatively simple draw. These "bugs" actually necessitated the rehoning of dies after each shift.

RESULTS WITH KONDOR DRAW—Without rehoning the dies, even though producing scored and wrinkled work as shown above, KONDOR DRAW was applied. After running several hundred pieces the parts came out smooth and completely free from scratching and wrinkling. Here again KONDOR DRAW proved to be the proper lubricant.

The use of KONDOR DRAW may be the answer to your drawing problems. Write for a generous sample or call in a KONDOR Engineer today.

KONDOR PRODUCTS
CORPORATION
INDUSTRIAL PROCESSING CHEMICALS
WEST CLIFTON BLVD. AT SLOANE • CLEVELAND 7, OHIO

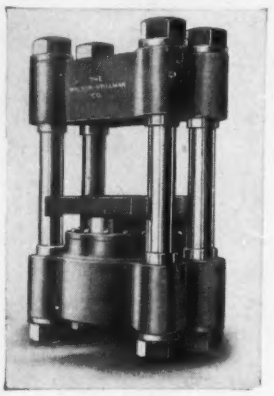
OFFICES AND WAREHOUSE STOCKS IN PRINCIPAL CITIES OF THE UNITED STATES AND CANADA

standard or tapered, drip threads and short nipples.

Steel 11/11/46; *Item No.* 9742

Die Press

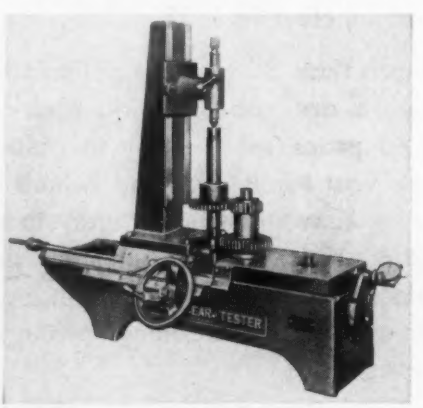
A 500-ton fully hydraulic hobbing press announced recently by Watson-Stillman Co., 109 Aldene road, Roselle, N. J., is designed to meet exacting specifications of master hobbers and die sinkers. Platens of open-hearth steel castings, with surfaces tooled to a smooth finish, accurately bored for the columns are suitable for full capacity loads on a small area. Adjustable babbitt guides incorporated serve as bearing surfaces for moving platen on small capacity presses. Presses are supplied with hand or motor-driven pumps. Motor-driven pumps are of the vertical triplex, horizontal or steady-flow type.



Steel 11/11/46; *Item No.* 9754

Gear Testers

George Scherr Co., 200 Lafayette street, New York 12, announces two new Parkson gear testers, both having a maximum capacity of 15 in. center distance. One of these is equipped with a box-shaped upright which carries an adjustable bracket with means for clamping it in any desired position—an arrangement that provides vertical centers for holding gears or pinions that are cut integral with their shafts or mounted on arbors.



Other model is specially designed for

VISIT J&L BOOTH
A-132
NATIONAL METAL SHOW

Smart modern designs for garden furniture, lawn mowers, wheel barrows, bicycles and other home utilities can be enhanced by use of J&L Electricweld Tubing. Its smooth, uniform surface provides an ideal base for painting, enameling and electro-plating, and most important its inherent strength and quality permits you to build with a minimum of weight—to sell the public with ease. Also J&L Electricweld Tubing will work smoothly in your bending, fabricating and welding operations.

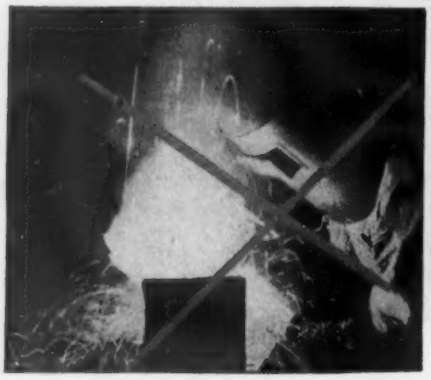
J&L STEEL

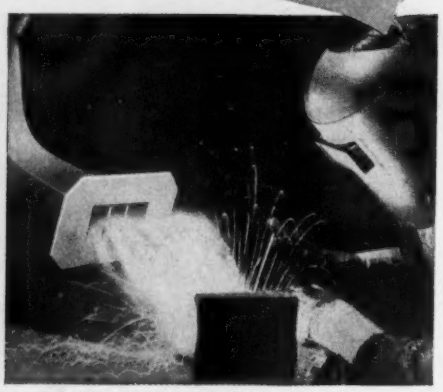
JONES & LAUGHLIN STEEL CORPORATION

PITTSBURGH 30, PENNSYLVANIA

Why the RUEMELIN FUME COLLECTOR *is a* REAL NECESSITY

● *THE OLD WAY*





● *THE NEW WAY*

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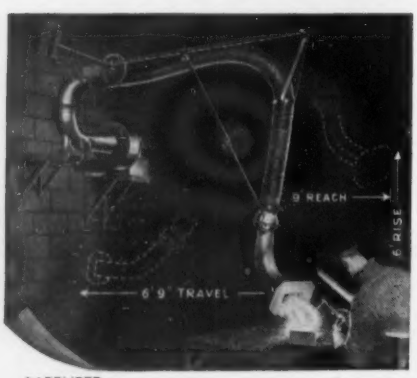


PATENTED

TWO MODELS!

- Long reach Model D-5342 — ideal for large welding booths; reaches out 15 feet from wall.
- Standard Model D-5310—used for standard welding booth ventilation; hood reaches out 9 feet from wall.

The Ruemelin Welding Fume Collector has been specially engineered to eliminate noxious fumes. The inlet hood maintains a constant high velocity over the working area, quickly removing heat and smoke *at the source.* Welders equipped with this device are assured of a clean shop atmosphere; the manufacturer gains by increased daily production.

The fume collector hood can be instantly placed where needed anywhere in the booth welding area. No tedious adjustment necessary. Just pull the inlet hood to the welding position and you are ready to go. Approved by state industrial commissions and by compensation insurance companies. Many users send in repeat orders. Write for bulletin 37-C today.

RUEMELIN MANUFACTURING CO.
3882 N. PALMER ST. • MILWAUKEE 12, WISCONSIN
Manufacturers and Engineers of Sand Blast and Dust Collecting Equipment

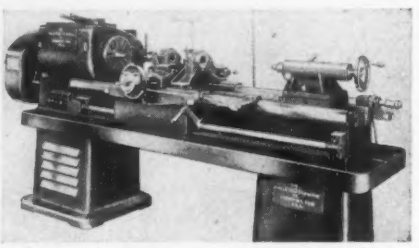
testing internal gears, either against the mating pinion or against a master. Whenever external gears are tested, measuring pressure in the floating slide which contacts with the dial gage, is towards the mating gear. However, when testing internal gears, the pressure has to be in the opposite direction. Internal model incorporates a simple and fool-proof arrangement, whereby the pressure can be reversed at will.

Both models embody a scale and oversize vernier for setting to correct center distance. Operation is by handwheel through rack and pinion.

Steel 11/11/46; *Item No.* 9714

Threading Lathe

Threading of long traversing, elevating and feed screws is performed on the automatic threading lathe, illustrated here, manufactured by James Coulter Machine Co., 629 Railroad av-



enue, Bridgeport, Conn. Equipped with disk clutch and handy starting and stopping lever, machine is especially adapted for production of square, standard and 29-degree threads, both internal and external. Lathe has a 4-speed headstock, accomodates large range in diameters and variety of materials.

Steel 11/11/46; *Item No.* 9904

Dewpoint Recorder

Dewpoint recorder which determines automatically and continuously the amount of moisture in gas is announced by General Electric Co., Schenectady, N. Y. Instrument is for applications, such as checking furnace atmospheres, or determining humidity of gases used in factory production processes.

Recorder is a combination heater, refrigerator, mirror and gas chamber. Test gas enters gas chamber and comes in contact with a metal mirror. Refrigerator and heater cool or heat mirror until a temperature is attained at which moisture in gas forms dew on mirror.

A photoelectric eye watches mirror, and mirror temperature is recorded on a graph or chart the moment dew forms. Refrigerator and heater hold dewpoint temperature within a tolerance of 2° F.

Recorder also is arranged so it will flash or sound a warning when mois-

DEPENDABLE POWER

AND IT'S STEADY, LASTING, ECONOMICAL POWER WHEN THE BATTERIES ARE EXIDE-IRONCLADS . . .

More and more, management executives are finding that Electric Industrial Trucks, powered by Exide-Ironclads, are the *right answer* to their materials handling problem. Numerous records prove that this efficient combination assures more tons per man per hour . . . and at lower cost, which means greater profits.

Exide-Ironclad Batteries deliver continuous service day in and day out for years. They have the *high power ability* required for frequent "stop and go" service . . . the *high maintained* voltage that constant lifting, hauling and stacking demands . . . and the *high capacity* needed to assure steady, day-long performance with full shift availability.

Write us for a FREE copy of Exide-Ironclad Topics which contains "Case Studies" of materials handling problems. It tells how to cut handling costs up to 50% . . . covers latest developments in handling materials from receiving to shipping.

Materials Handling offers one of the greatest opportunities for reducing costs and increasing profits, that are available to Management today.

ELECTRIC INDUSTRIAL TRUCKS POWERED BY EXIDE-IRONCLADS HAVE ALL THESE FEATURES . . .

Inherently dependable

Built for long, hard service

Provide maximum safety . . . best working conditions

Fast handling and accurate spotting

Effective use of lowest cost power

Lowest overall cost

HIGHEST EARNINGS
GREATEST SAVINGS

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia 32 • Exide Batteries of Canada, Limited, Toronto

Now!

HEAT TREAT HIGH SPEED STEELS

RIGHT IN YOUR OWN PLANT

QUICKLY AT LOW COST

No wasted time with *Quick Acting* JOHNSON Hi-Speed No. 130A Furnaces

Reduce Toolroom Bottlenecks with *Quick Acting* JOHNSON Hi-Speed No. 120 Furnaces

● Powerful Johnson Hi-Speed No. 130A reaches operating temperature fast to save time and gas. Gets the job done before conventional type furnace warms up. Available in two temperature ranges. The four-burner unit for steels, dies and tools requiring temperatures from 1400 to 2350° F. or the six-burner unit developing 1800 to 2400° F. for high speed steels exclusively. Burners fire under hearth to assure high uniform heat. Temperature easily regulated with accuracy. Counterbalanced door opens upwards. Firebox 7¾ x 13 x 16½ lined with high temperature insulating refractory. Complete, ready for action with Carbofrax Hearth, G. E. Motor and Johnson Blower.

4-Burner $295.00 6-Burner $325.00
F. O. B. FACTORY

Compact, powerful and remarkably low in operating cost, Johnson Hi-Speed No. 120 reaches 1500° F. in just 5 minutes from a Cold Start! Develops 2300° F. in 30 minutes. Ideal for heat treating high speed steels . . . for hardening any steel dies, tools or small metal parts. Two powerful burners fire under hearth to assure high uniform heat. Firebox 5 x 7¾ x 13½ lined with high temperature insulating refractory. Equipped complete with Carbofrax Hearth, G. E. Motor and Johnson Blower.

$129.50 *F. O. B. FACTORY*

FREE
New JOHNSON Catalog
Describes the complete line of Johnson Furnaces for pot hardening, melting, annealing, and heat treating. Shows industrial gas burners for every purpose. Write for copy.

● *There is a Quick Acting Johnson Furnace for Every Heat Treating Need. Write for Descriptive Literature.*

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JOHNSON GAS APPLIANCE CO., 573 E Avenue N. W., Cedar Rapids, Iowa
Please send me New Free Johnson Furnace Catalog.

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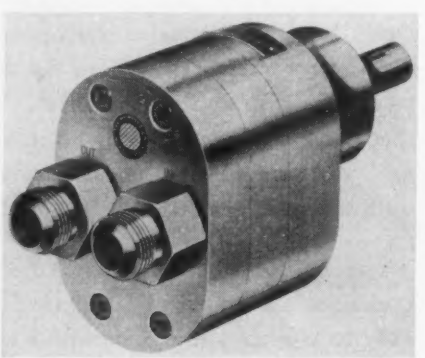
ture in gas reaches too high or too low a level. It is designed for operation at

atmospheric pressure over a dewpoint range from ambient to minus 90° F.
Steel 11/11/46; *Item No.* 9580

High Pressure Pump

Series 700 pump developed by McIntire Co., 15 Riverdale avenue, Newton 58, Mass., is designed for high pressure application for material handling equipment, machine tools, power transmission and



low-capacity pressure circulation and delivery functions. Direct drive spur gear pump is a small 6-lb unit operating with a volumetric efficiency in excess of 90 per cent and a mechanical efficiency in excess of 80 per cent. Four models displace from 0.4 to 9.6 gpm at speeds ranging up to 1750 rpm.

Standard models are designed for direct

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MACWHYTE

YOUR HEADQUARTERS

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WIRE ROPE SLINGS

Great reserve strength and maximum safety are two things you can count on when you use Macwhyte Slings. They handle your loads fast, easily, economically. They cut unit handling costs to the bone, help prevent costly production delays.

Whatever your job, you can get Macwhyte Slings tailor-made to fit. The stamina of our best grade wire rope assures long sling life on your equipment. Enduring service is built into each sling by wire rope craftsmen, skilled at their trade.

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Manufacturers of the CORRECT wire rope for your equipment

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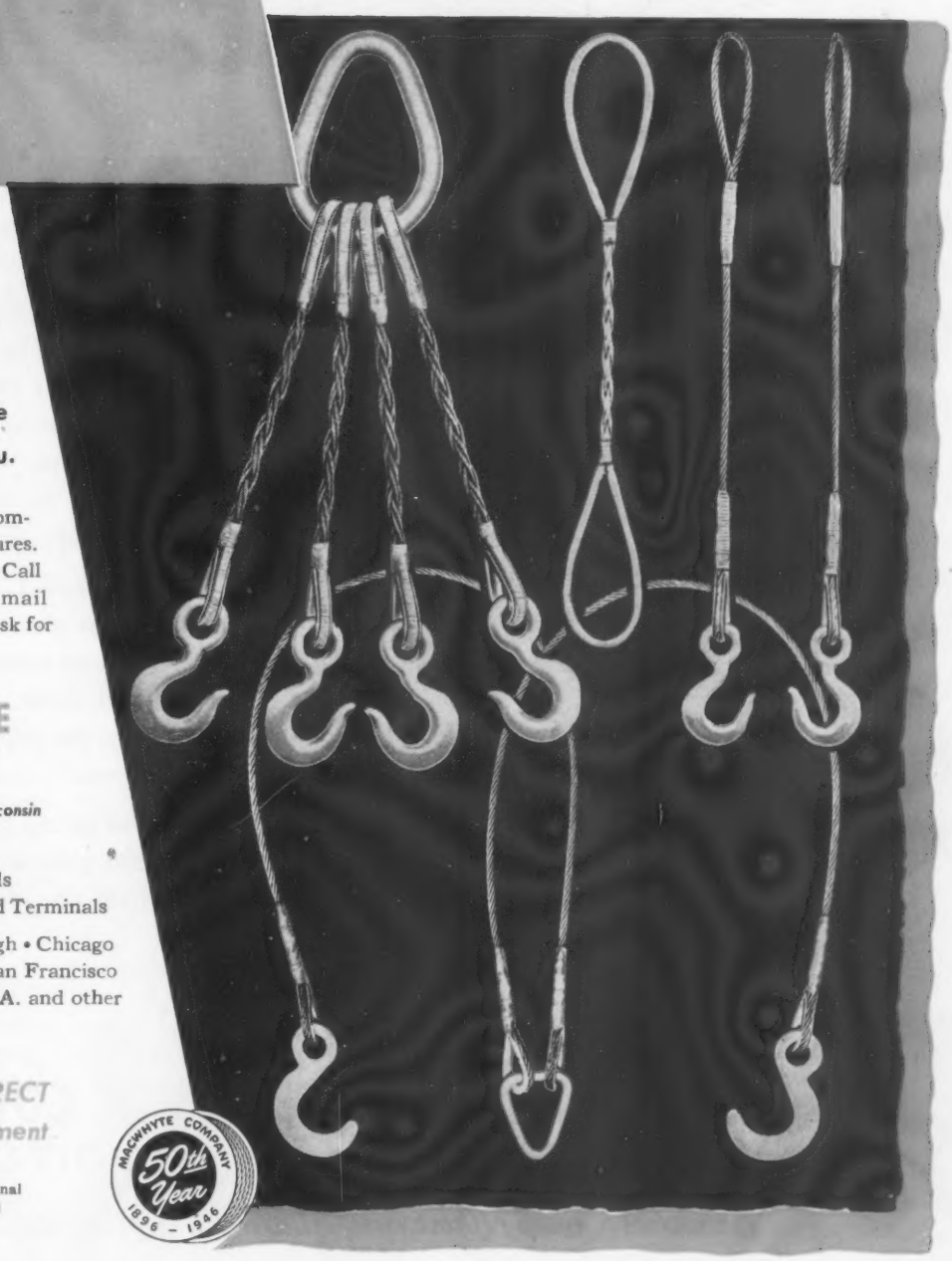


INCREASE YOUR LABOR-PRODUCTIVITY by broaching ----- WITH Colonials

Typical and fairly average example of metal removal possible by broaching. Automotive steering knuckles—broached at rate of 360 pieces per hour on a Colonial Dual Ram machine . . . REMOVING 450 CU. IN. OF METAL AN HOUR!

Broaching offers one of the readiest answers to today's biggest manufacturing problem—how to increase the productivity of the individual worker to justify higher wages.

The reason of course is that broaching is the fastest method of metal removal known—and one of the most accurate. Moreover, though Colonial machines usually pay for themselves in short order, they do not become obsolete when models are changed.

With Colonial Broaching machines and broaches, and through Colonial's engineering service, you can obtain all the benefits of special purpose automatic machinery combined with the long life—for capital write-offs—of standardized machines.

Write us today for a study of how Colonials can increase your labor productivity. There is a Colonial field engineer near you.

colonial BROACH COMPANY
DETROIT 13, U.S.A.

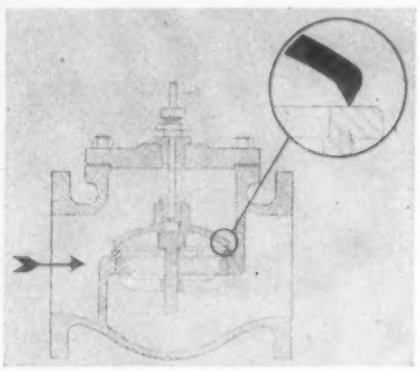
Broaches — Broaching Machines - Broaching Equipment

motor application, but pumps can be furnished for flange, belt, spline and other drives. Power requirements vary between fractional to 6½ hp. Pump body is of aluminum with nitrided nitralloy gears. Sealing is accomplished with linear packing double U cup seals.

Steel 11/11/46; *Item No.* 9726

Nonsticking Valve

To eliminate the sticking of valves caused by dirty coke oven gas Automatic Temperature Co. Inc., 34 East Logan street, Philadelphia 44, has designed special single-seated globe valve, Type GSF-35. As seen in the cross-section, the valve seals with a knife edge, not only



reducing sealing surface but also cutting through heavy gum deposits that may be on surface.

Valves, available in 1 to 6-in. sizes are usually motorized for either automatic operation from control instruments contacts, or manual operation from remotely located push-button stations. Motor opens or closes valve in 3 sec. Handwheel is provided for emergency operation. Valve is made in explosion-proof and weatherproof designs.

Steel 11/11/46; *Item No.* 9720

Temperature Controller

Model 40 controller, developed by Foxboro Co., Foxboro, Mass., controls temperature, pressure, flow or other variables in continuous processes. Characteristic of controller is its adaptability in changing from one type of control to another. Setting proportional band, from 0 to 200 per cent or higher, is made by turn of a thumb wheel. Reversal of instrument action is in like manner. Range of reset is 500:1. Transfer switch enables operator to change from manual to automatic control with no valve motion.

Controller is made as an indicator as well as a single pen and multipen recorder and is offered for several types of actions.

Steel 11/11/46; *Item No.* 9731

WIRE

HIGHEST QUALITY AND SERVICE GUARANTEED

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Round + Flat + Square
Straightened and Cut
Shape Wire

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HIGH CARBON SPRING
LOW CARBON BASIC & BESSEMER
OIL TEMPERED
WELDING WIRE RODS AND COILS

WIDE RANGE OF SIZES AND FINISHES

•

Wire for Practically All Purposes
and Requirements
Also SCREEN WIRE CLOTH

"SENECA" WIRE — QUALITY — TRADE MARK — STEEL

FLAT COLD ROLLED
STRIP STEEL
NARROW WIDTHS

The SENECA WIRE & MFG. CO.
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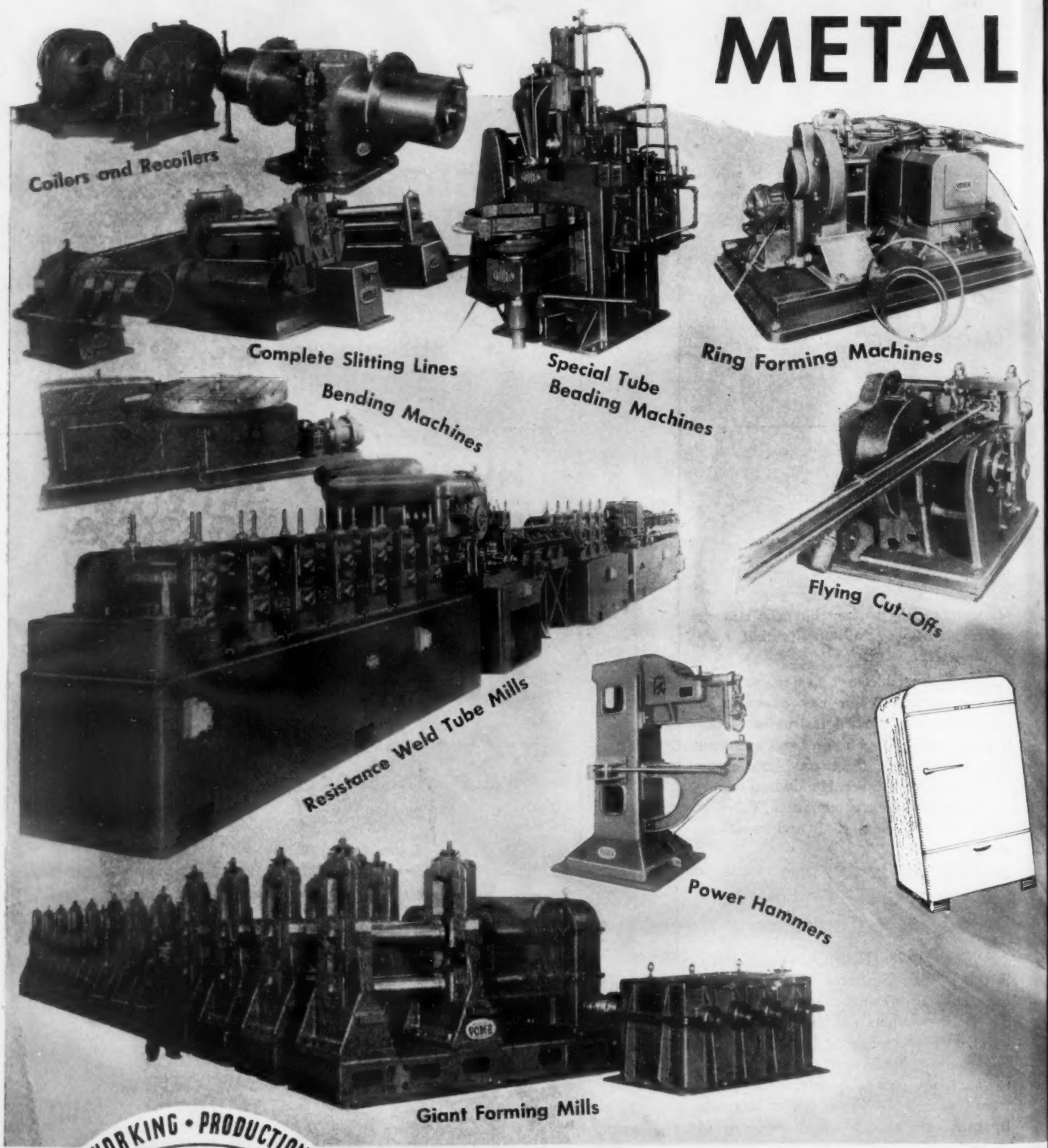
Representatives and Warehouses in practically all Principal Cities

THE YODER LINE IS METAL



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The YODER

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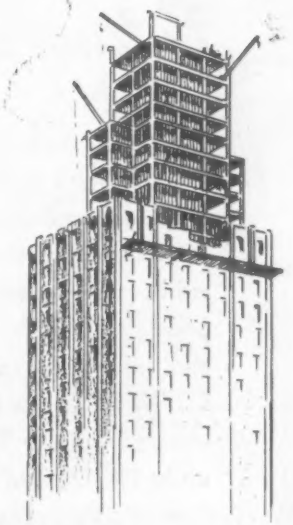
A YEAR AROUND WORKING "EXPOSITION"

If you could see at one time all of the vast variety of Yoder special metal working machinery and the production of much needed goods it makes possible daily, you would have a demonstration as great, and as important, as the National Metal Congress and Exposition, renewed at Atlantic City this month.

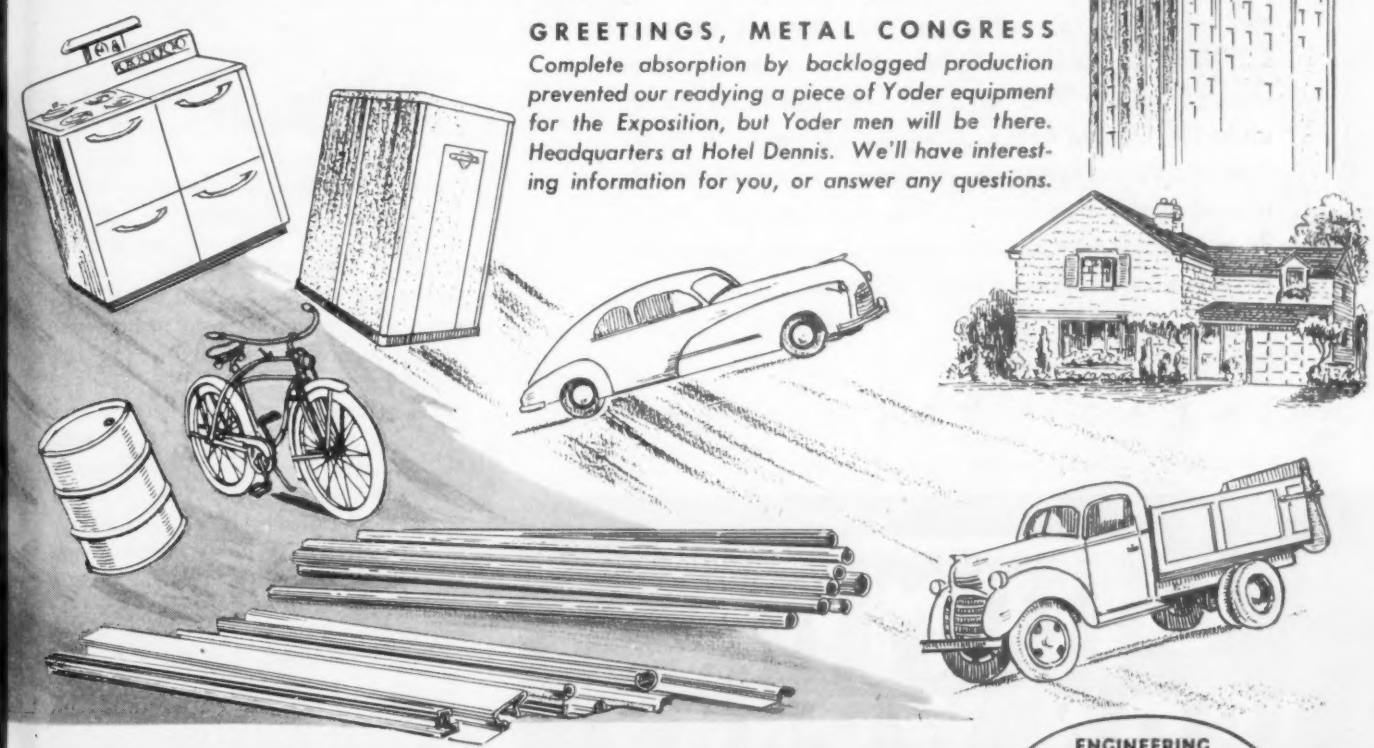
Yoder "engineered for the job" machinery has the same special purpose as the Metal Congress, namely exposition of the most efficient methods of production of metal goods. From power hammers to huge plate levelling mills . . . from coil boxes to complete plants for the production of pipe or tubing in any size up to 36" OD, the variety of applications for Yoder Machines reaches into every branch of the metal working industry.

Whether you make air-conditioners or aircraft parts, doohickies or dump-trucks, you probably run into production problems for which Yoder can give you an answer, either from the regular line or something fresh off the fertile boards of the Yoder designing and engineering service.



GREETINGS, METAL CONGRESS

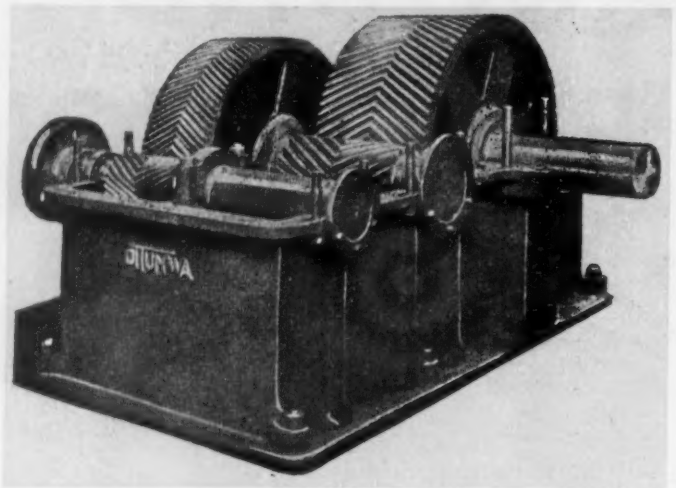
Complete absorption by backlogged production prevented our readying a piece of Yoder equipment for the Exposition, but Yoder men will be there. Headquarters at Hotel Dennis. We'll have interesting information for you, or answer any questions.



ENGINEERING YODER MANUFACTURING

COMPANY

CLEVELAND 2, OHIO



Putting a principle to work

The double helical principle was well known for years, but its application was limited beyond an angle of 23 degrees. The Sykes generators impose no limits on the maximum helix angle, but the 30 degree angle was chosen as standard because this angle gives the full benefit of the helical principle. OTTUMWA cuts Sykes gears for speed reducers and increasers, and really puts this principle to work. OTTUMWA can furnish Sykes continuous tooth herringbone gears up to 10'2" dia., 24" face, and in all pitches up to 1¼ D.P., in steel or semi-steel. We also cut blanks furnished by our customers. Write for our catalog. It contains illustrations and descriptions of a complete line of gears, together with a complete line of speed reducers and increasers for all types of industrial drives.

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Magnesium Alloys

(*Continued from Page* 152)

is discussed later in this article.

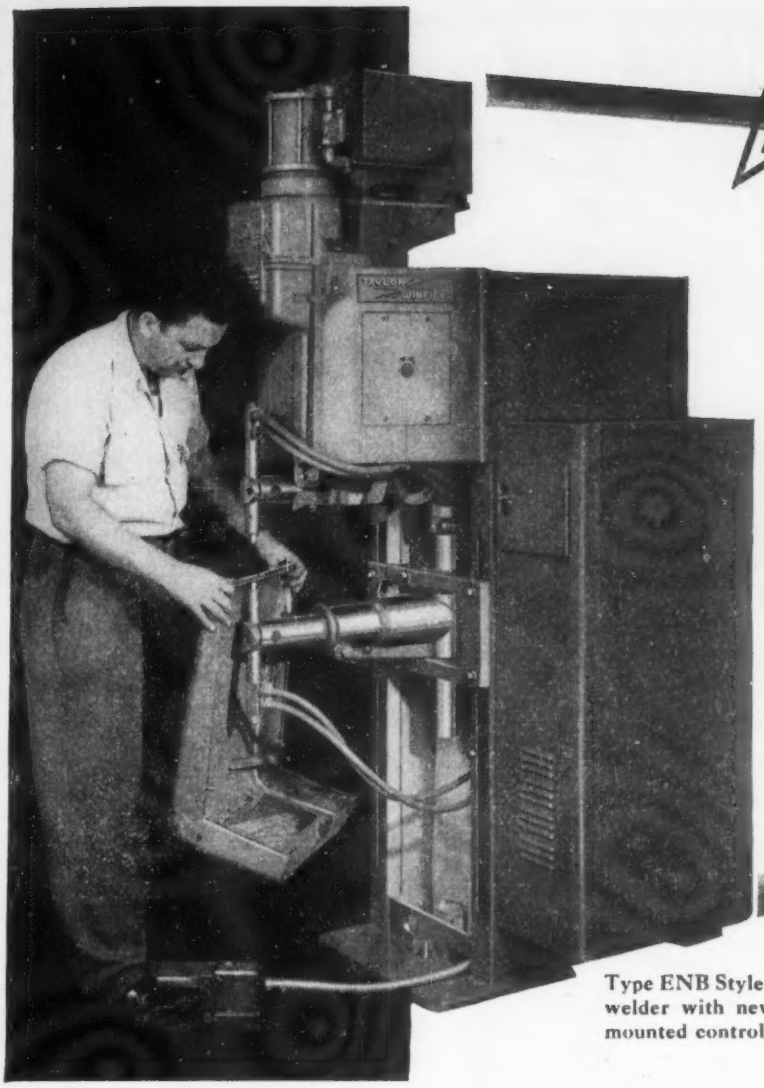
The usual pouring temperature range for die casting is from 1175 to 1250° F, so the oxidation tendency for the metal is relatively low. Because of protective atmosphere, the metal in the pot acquires a thin surface film which must be parted when the ladle is introduced. Evidence of undue oxidation on the metal surface after ladling means that the sulphur dome is not working properly. Sometimes a very slight dusting of sulphur or other similar agent on the edge of the dome may be required to control oxidation. In no case would fresh flux be added to the pot unless the entire refining and sludge removal processes were to be repeated. In continuous operation, particularly if ingot is added directly to the pot, it may be necessary to reflux the pot every 4 to 8 hours. Ordinarily, from 1 to 3 per cent of No. 220 flux is used.

Unless absolutely unavoidable, it is not good practice to make alloy or alloy additions in the premelting or die casting pot.

Scrap Melting: The melting and refining of die casting scrap presents a special problem different from that for the bulk of magnesium scrap, in that a certain proportion of carbonaceous materials, lubricants, etc., is present on the scrap. Melting and refining in No. 230 flux, see Table XII, as in ordinary practice, is not satisfactory. A reddish scum of the carbonaceous material seems to remain suspended throughout the metal. This behavior is eliminated through the melting of such scrap in open pots or crucibles, using No. 310 flux instead of the usual No. 230. No. 310 flux has the characteristics necessary to agglomerate the carbonaceous film and refine this material.

Die Temperatures: Die temperatures ordinarily run from 250 to 600° F., with 400° F. as a good average temperature. In regular operation, the heat is maintained in the dies by balancing the production rate. It is sometimes found that water cooling channels in the die are needed to limit the temperature to the desired degree. The optimum operating temperature for the individual die can be found only by actual operation.

In general, however, castings requiring a large amount of metal will require water cooling of the die. Freedom from surface swirls and cold shuts is possible only when dies are maintained at the proper temperatures. Dies gradually become coated with a thin film of oxide, making other die coatings generally unnecessary. Too high die temperatures



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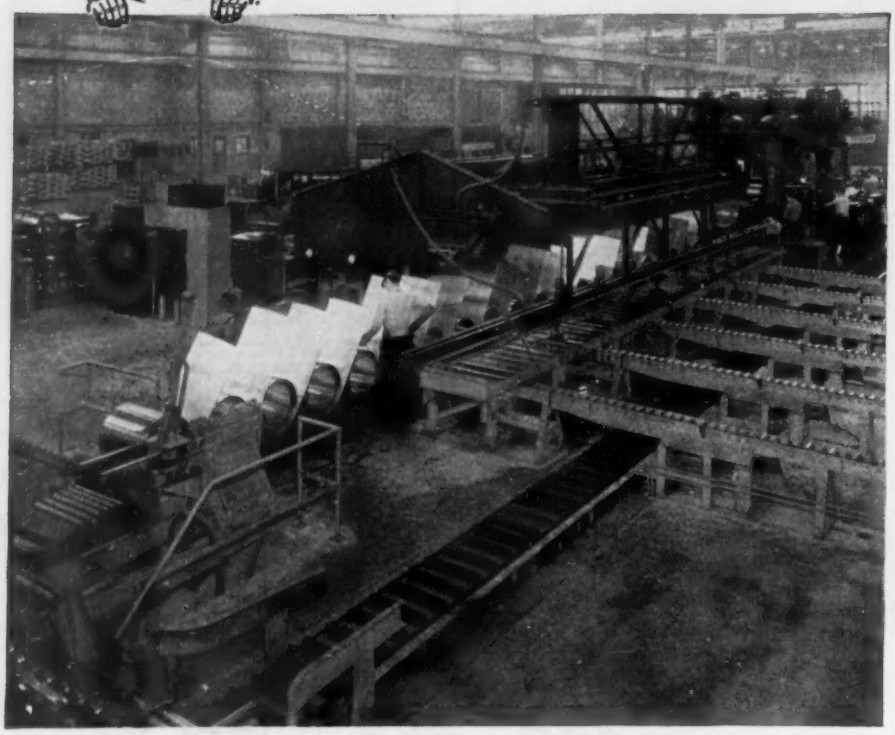

EVERY manufacturer, in striving to keep costs at a minimum, must deal with more or less difficult material handling problems. These are not always quickly solved, and usually require considerable thought by plant and conveyer engineers. Most experienced plant engineers agree that the use of Mathews methods and Mathews equipment means efficient material handling. That is why Mathews Engineers are usually called in on the problem requiring special attention. There are many types of Mathews Conveyers of both gravity and power designs, and from these types are selected the units which make up Mathews continuous flow conveyer systems. It is with such systems that prominent manufacturers are reducing worker fatigue and keeping materials moving through processing machinery, storage and shipping, with a minimum of product re-handling, costly confusion and delay.

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may cause excessive oxide film on the dies and rough surfaces on the castings.

When all conditions of the metal and dies are ready for casting, the pouring ladle is preheated on the rim of the pot before introducing it into the molten metal. Afer this preheat, the ladle may be held under the surface of the molten metal in the pot to bring it up to the metal temperature. This will prevent the metal from freezing to the ladle in the dipping operations. Ladle is filled by parting the protective film with the back of the ladle and dipping into the bath. The ladle is then lifted from the pot, transported to the machine, and the contents poured into the well. The injection is applied or the shot made as soon as the last bit of metal from the ladle is poured. Accurate operation timing and shot speed is essential to constant production of good quality castings. Only experience on a given job will tell how soon the die should be opened after the shot.

Sizes and Tolerances: The limitation on maximum size of castings will be dependent, of course, on the equipment available. As stated previously, the size of the casting which may be made on a given piece of equipment is related to the projected area of that casting and the injection pressure required to produce a satisfactory product.

While wall thicknesses as low as 0.040-in. have been successfully cast, the more practical minimum is about 0.050-in. It has been suggested[11] that an approximate rule for wall thickness up to 0.130-in. has been 1/1000 of the surface area; thus the minimum thickness for an area of 100 sq in. would be 0.100-in. Numerous exceptions to this rule occur due to casting design and the relations of the area in question to the gates.

The following tolerances generally apply to magnesium die castings: Tolerance per inch of dimension—plus or minus 0.0015-in.; minimum tolerance within solid die—plus or minus 0.003-in.; minimum tolerance across parting line or between solid die and movable die parts—plus or minus 0.005-in.

Die casters usually furnish the parts as cast with either the original surface or perhaps a chemical treatment for protection during storage. Machining is easily accomplished, usually dry, but with an oil type coolant for high-speed operations if very accurate dimensions must be maintained. For extreme accuracy of parts, it may be desirable to stress relieve the die castings by heating for 2 to 4 hours at about 400° F. before machining. Such a treatment also results in a stabilization of the alloy constituents so that a negligible amount of growth would take place if the casting

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is to be subjected to elevated temperature use.

The chemical treatment usually applied by die casting producers is the chrome-pickle treatment, or perhaps, in some cases, the dichromate treatment.

(To be continued)

REFERENCES

10. American Foundryman July, 1945
11. Light Metal Age, 2 (No. 1) 1944

Lead Flooring Protects Plating Shop Floor

To protect its shop from the corrosion resulting from use of various solutions in electroplating, United Platers Inc., Detroit, recently covered the entire second floor of their shop with sheet lead. The object was to protect the concrete floor from disintegration and to eliminate leakage to floor below.

After all equipment was removed, a cushion of six layers of builders felt was mopped down over concrete, after which the lead was laid, smoothed out and fitted with all joints butted for welding. Entire room, 105 x 18 ft, was covered by a single pan of 8 lb sheet lead, turned up 12 in. at sides and provided with drains.

According to *Lead*, the publication of Lead Industries Association, plating industry is increasing use of electroplating as a means of applying protective lead coatings, as well as using it as a construction material, such as in the flooring application. It is said that under unusually severe conditions of exposure, a lead coating will provide a high degree of protection from corrosion. It is reported to be especially desirable on springs because it reduces possibility of hydrogen embrittlement.

Nickel Base Alloys Resist Corrosion

Wide range of uses is reported for two new high-strength nickel-base alloys, Chlorimet No. 2 and Chlorimet No. 3, developed by Duriron Co. Inc., Dayton. Consisting primarily of nickel and molybdenum, Chlorimet No. 2, combines these elements to give the alloy excellent resistance to corrosive action of many acids, particularly hydrochloric in all concentrations and temperatures, including boiling, The company states that it also resists 35 to 60 per cent solutions of sulphuric acid.

Chlorimet No. 3 consists primarily of nickel, chromium and molybdenum. It is capable of resisting most acids, especially under oxidizing conditions. Sulphuric solutions in concentrations less than 35 per cent and at temperatures up to 176°F do not effect alloy, nor do sodium, zinc, or nickel chlorides.

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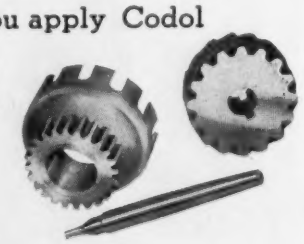

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Porcelain Enamel

(*Continued from Page* 156)

lain enameling and its materials—the enameling iron and steel, the frit, and the methods of application. The quality of the iron and steel is an important factor in the quality of the finished porcelain enamel. The new approach to the better adherence for porcelain enamel direct to steel involves entirely new compositions of the metal, one of which is the introduction of titanium, on which research is continuing.

As far as the porcelain enamel frit is concerned, there has been a vast improvement in its quality during the past few years. Tests developed through research at the National Bureau of Standards, and sponsored by Porcelain Enamel Institute have enabled enamelers to determine the relative merits of various formulas—not possible before the development of these PEI tests. Practical applications of these tests are being made today in many plants.

The resistance of porcelain enamel to deep scratching or gouging is measured by the penetration of a steel ball into the enamel under a given load. Surface scratching or abrasion resistance from constant handling or cleansing powders is measured in terms of the time required to remove the gloss under the abrasive action of a standard quality of feldspar. In constant testing, the time required to show the slightest effect on any grade of porcelain enamel is far in excess of that required to destroy the most abrasion resistant synthetic coatings.

Tests for acid resistance vary with the type of service in question. Tests for acid resistance of a kitchen table top are considerably less vigorous than those for porcelain enamel to be used in piping for handling corrosive acids and chemicals.

The adherence of porcelain enamel is measured by dropping a standard steel ball of a given weight from a height sufficient to produce a semicircular impression distorting the metal. The adherence of the coating is measured by the amount of porcelain enamel which is removed in this operation.

Porcelain enamel has a high reflectance not only when new, but it maintains this high reflectance as time passes. Because of this characteristic it presents an attractive appearance and has the ability to reflect heat. A special reflectometer is used to measure amount of light reflected from enameled surfaces.

Now it is readily possible, and, in fact, standard practice, to use a specific porcelain enamel formula for a specific application. If, for instance, the object to be porcelain enameled is for use in a chemical operation where high acid resistance

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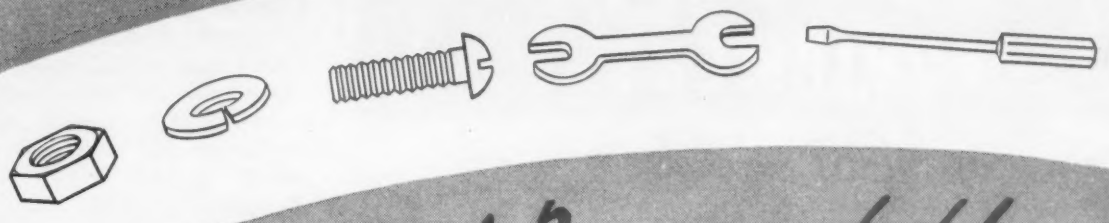

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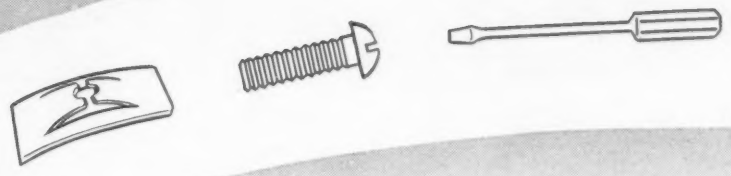

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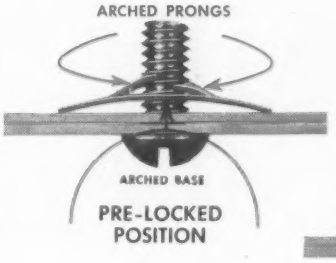

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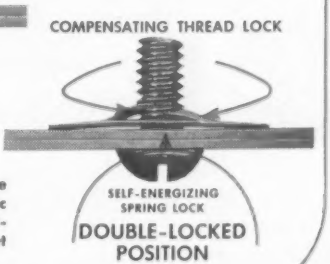

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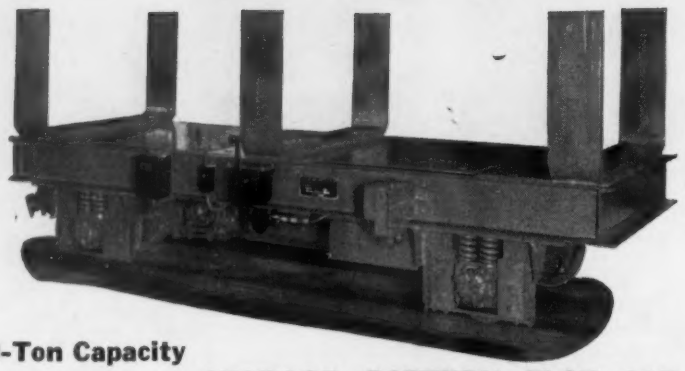

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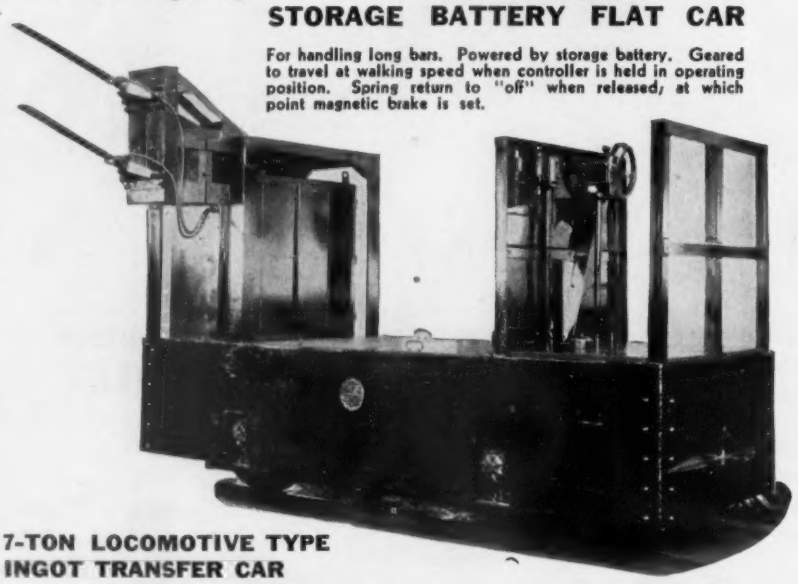

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is required, an acid-resisting porcelain enamel formula is used. On the other hand, if constant handling of the article will tend to wear off the finish (as might be the case of a refrigerator door handle), abrasion is the main problem, and a porcelain enamel with high abrasion-resisting characteristics is employed.

In ordinary service, porcelain enamel is practically ageless. In itself, it never deteriorates or fades. It is proof against temperatures that would destroy ordinary surfaces.

Methods of Application: Thorough cleaning of the metal as a starting point in the porcelain enameling operation is one of the most important factors contributing to high finished quality. The industry in the past years has intensified its research into better cleaning methods, and even today entirely new cleaning techniques have been introduced, superseding some methods which have been in use only a few years.

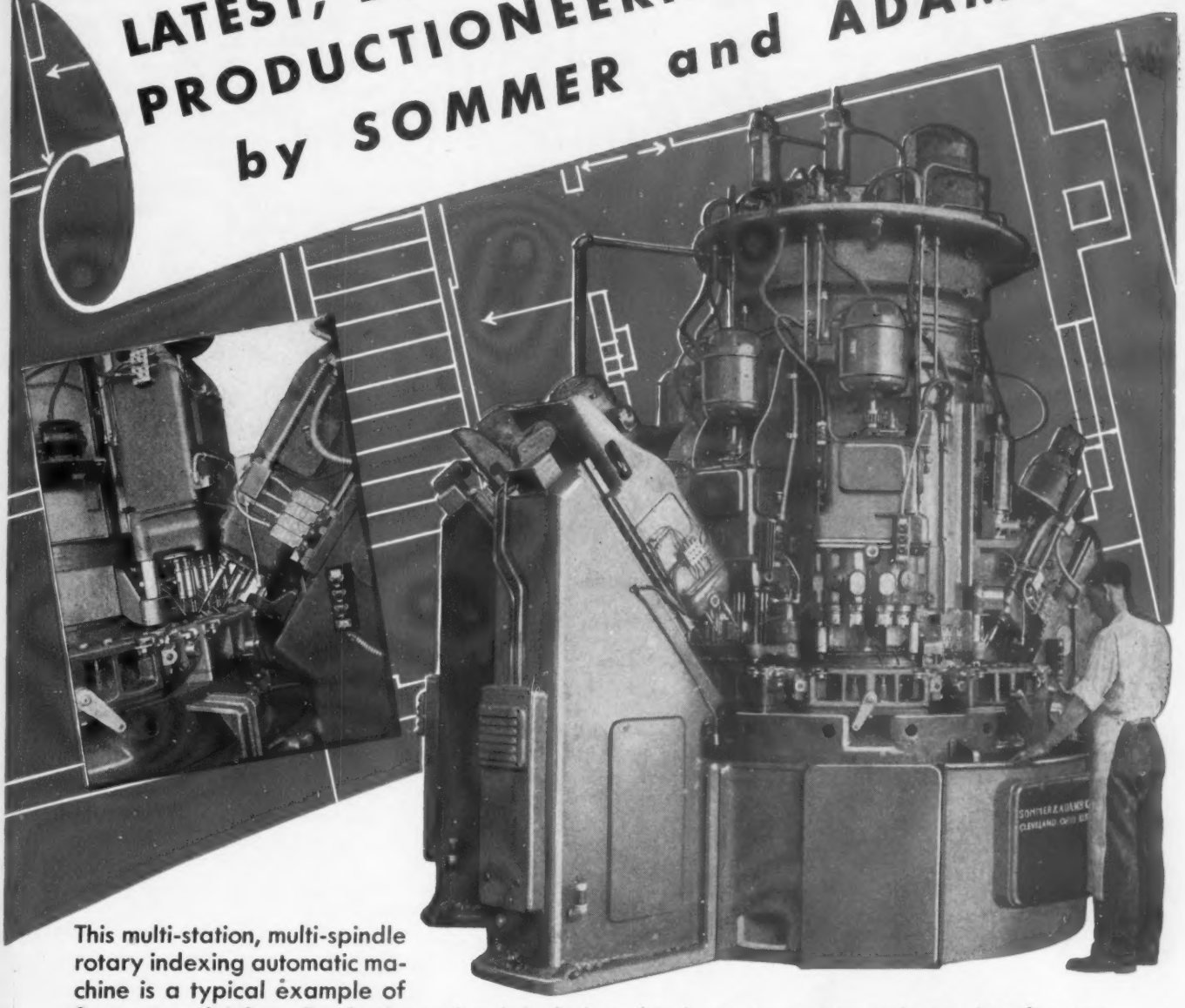
Improvements have been made in furnaces; today, continuous furnaces are replacing box-type units. Continuous spraying has speeded up the operation and reduced costs. In addition, practically all porcelain enamel plants are highly conveyorized.

Formerly all application of the porcelain enamel to the metal was done by dipping. Today the spraying method is also in general practice. Spray coating is better confined to relatively plain shapes such as stove panels shown in Fig. 3, because there is danger of incomplete coverage of more complicated parts. Dipping is unsuited to parts which are to be coated on one side only or parts which will not drain properly without streaking after immersion in the slip.

Electrostatic spraying of porcelain enamel has been introduced for use where very thin coatings are desired, and where it can be applied, results claimed for it are a considerable saving of time, labor and materials. The electrostatic process, a setup for which is shown in Fig. 1, involves the charging of spray particles in an electric field and the attraction of these particles to the ware which is to be enameled. Ordinary methods of spray gun manipulation involve considerable losses due to overspray, and to reclaim this material is a difficult, and in some cases impossible, operation. By eliminating overspray and producing a coating of uniform thickness without waste, the electrostatic method tends to reduce losses in material, increase quality and lower cost of production.

To fully understand the future possibilities of porcelain enamel, it is necessary to be acquainted with the actual steps in its manufacture. After the iron or steel has been fabricated, it is thoroughly

LATEST, BUT NOT LAST, PRODUCTIONEERING UNIT by SOMMER and ADAMS



This multi-station, multi-spindle rotary indexing automatic machine is a typical example of Sommer and Adams Productioneering. It is designed to bore, ream, counterbore, chamfer, tap and face a number of holes in small motor blocks, pump parts or machine components.

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cleansed in acid or alkaline baths and then coated with a mixture of frit and water and passed through a drying oven which removes the water in the mixture, leaving a deposit of dry, ground porcelain enamel. The parts are then carried into the enameling furnace, heated up to 1500°-1600° F, two of which are shown in Figs. 2 and 4. The dry, powdered porcelain enamel is fused into the metal to form a continuous, homogenous film of glass-like composition.

Usually the first coat is a dark blue, containing cobalt, which acts as a binder for the subsequent cover coats, although modern practice is working toward the direct application of the cover coat to the steel. After the first coat, either one or two additional cover coats are applied over the primary coat in the desired color for the finished product. Each such coat requires a separate application and firing operation. The furnace time for sheet metal parts varies from 3 to 5 min.

The single coat application, for which the porcelain enamel industry is striving, offers many advantages. It will permit considerable reduction in the cost of porcelain enamel application, and it will greatly widen the product's potential markets. The thinner coats provide a greater flexibility so that porcelain enamels can be applied to thinner gages of metal and at the same time stand a good deal more abuse in rough service.

Actually, porcelain enamels have been made and applied to tissue paper-thin steel. A great deal of research is being made to develop porcelain enamel for thin steels that can be handled almost as wallpaper in rolls.

Proposed Machine Pin Standard Being Distributed

A proposed American standard for machine pins was recently completed by Technical Committee No. 23 of sectional committee on standardization of small tools and machine tool elements. It is now being distributed to industry for criticism and comment, copies being available upon application to Mr. C. B. LePage, assistant secretary, American Society of Mechanical Engineers, 29 West 39th street, New York 18.

—o—

Covering opportunities for productive work through mineral industries research, a new publication of the experiment station of the School of Mineral industries, Pennsylvania State College, State College, Pa., is now available free of charge. This publication, Circular 20, includes material on the importance of the mineral industries to other industries, objectives and organization of the experiment station.

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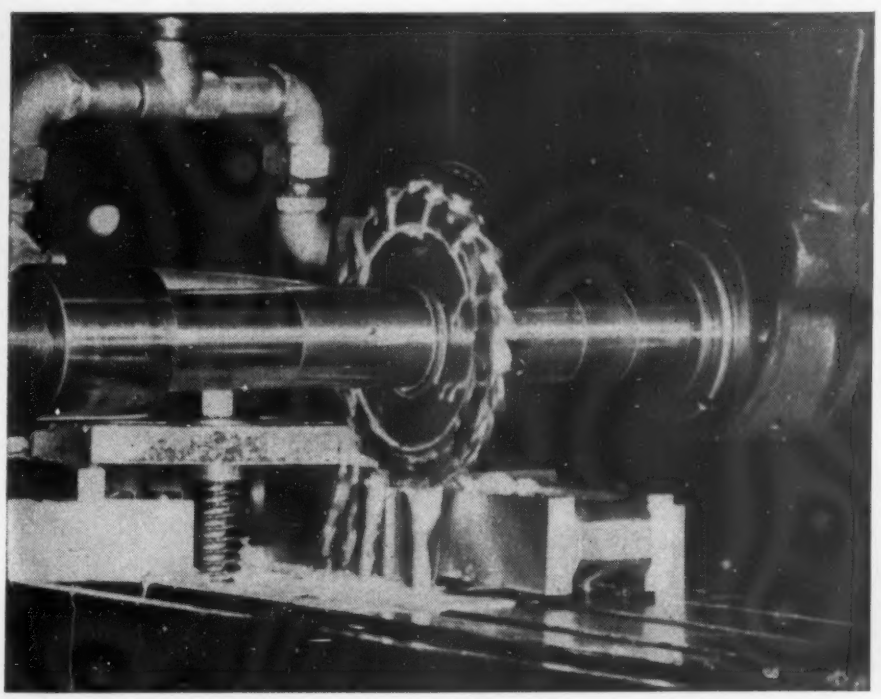

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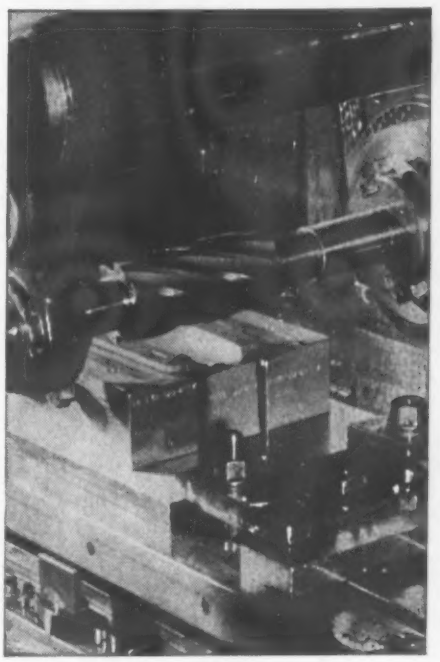

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Selecting Crane Equipment

(*Continued from Page* 175)

made in a similar fashion as that described above for direct current operated cranes.

For class 5 severe duty cranes, the mean root square method is again employed, but serious consideration must be given to class B insulation, as well as the totally enclosed, externally fan-cooled motor, particularly on magnet and grab bucket cranes, where space factor is at a premium. Large motors on overhead traveling cranes necessitate greater end approaches, and therefore diminish the actual floor coverage of the crane.

For class 5 cranes that do not have a definite duty cycle, the hoist motors can be determined by finding the horsepowers required under the foot-tons method, and selecting a motor with an actual running horsepower for the hoist motion that does not exceed 80 per cent of the rated horsepower of the motor. It will be noted that on alternating current cranes 80 per cent is selected, whereas on direct current cranes, 60 per cent is the determining factor. This is because the winding on alternating current motors is embedded in the steel stator core, and this core is directly connected through its entire circumference to the outside frame of the motor. Therefore, radiation of heat on an alternating current motor is a good deal better than that for a corresponding direct current motor.

Brakes: Selection of brakes involves various types used on overhead traveling cranes, such as alternating and direct current electric magnet brakes, hydraulically or mechanically operated foot brakes, constant drag brakes and combination electric-hydraulic brakes.

The selection of brakes on an overhead traveling crane is dependent upon the classification of the crane, the horsepower of the motor, as well as the type of control that is used in conjunction with the crane. Brakes should be equipped with a brake lining material that provides a constant coefficient of friction, does not wear rapidly, and that does not score the brake wheel, but rather provides a polish to the wheel. The brake mechanism should be designed to provide a minimum of adjustments. These adjustments need not be disturbed when replacement of armature is found to be necessary.

Direct current operated brakes equipped with series wound coils should release at 40 per cent of the rated current of the hoists motor while alternating current brakes should release at least 80 per cent of rated voltage. Hydraulically operated brakes should be designed so that pedal pressure and stroke is not fatiguing to the operator, preferably with a pedal pressure 30 lb or under.

Overbraking a crane can be just as detrimental as underrating brakes. Too much braking torque on the hoist motion will cause sudden stops, and thereby cause excessive wear on keyways, splines, gear teeth, bearings, etc. Selection of brakes for the hoist motion of cranes under the classification 1, 2, 3, and 4, should be on the basis of 150 per cent torque of the name plate rating of the hoist motor when used in conjunction with direct current dynamic lowering control as well as alternating current operated cranes equipped with a mechanical load brake.

It is a known fact that the alternating current solenoid is the fastest acting of any means so far presented. However, it is limited in its application to an electric brake, since the pull of the solenoid and its stroke is a determining factor of the maximum torque rating of the brake. Consequently, on heavy capacity power house cranes requiring large torque rated brakes, it may be necessary to resort to two brakes in parallel to obtain the necessary torque rating.

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classification 5, severe duty cranes, again depends upon service in which the crane is operating, and type of control apparatus used in conjunction with it. For instance, on a magnet crane for alternating current operation used in conjunction with regenerative type of control, it should have a brake with a torque rating at least 200 per cent of the name plate rating of the motor. This same holds true for grab bucket cranes equipped with regenerative type of control. For these two types of cranes equipped with dynamic lowering or counter-torque type of control, a brake of 150 per cent torque rating would be considered sufficient.

In alternating or direct-current operated class 5 cranes, two electric brakes are usually employed, each possessing 100 per cent torque rating of the motor. One of these is mounted on the motor extension shaft, and the other on the motor coupling extension shaft. This allows the use of two similar brakes, providing a more economical installation cost, as well as minimizing spare parts.

In the selection of alternating-current operated brakes for any of the five classifications of cranes, due consideration should be given to the use of the direct-current operated magnet brake in conjunction with the dry type rectifier unit. This combination provides for alternating current installations, durability and ruggedness of a direct-current operated brake, together with the time proved dry type rectifier which has no moving parts, and which can withstand vibration encountered on overhead traveling cranes. This brake used in conjunction with a low voltage, direct current, shunt wound coil gives the same characteristics as a series wound coil.

Modern practice dictates use of a hydraulically operated brake, rather than a mechanically operated brake, as it is readily installed, and provides the feature that on double bridge drives it can be readily synchronized to operate two brakes from a single foot pedal. The mechanically operated brake, with its long linkage and drag link connections requires constant attention, both from the lubrication point of view, as well as maintenance angle.

Trolley motion for roller bearing cranes should be equipped with 50 per cent torque. Free movement of the roller bearing trolley necessitates the use of a brake, either of the electric type or of the constant drag type. Experience shows that a 50 per cent torque brake of either of the above types will provide a gradual stopping action of the trolley under average load conditions within the rated capacity of the crane without undue swinging of the load. Under constant maximum capacity loads, selection of a 75 per cent, or even 100 per cent brake may be necessary.

On all outdoor operating cranes, where the cab is attached to the bridge, an electric hydraulic brake should be installed on the bridge motion. This brake combines an electric release, as well as a hydraulic closing. The selection of this brake should be made on the same basis as the hydraulically operated or mechanically operated foot brake mentioned above. It can be seen that when parking a crane overnight, and if such a combination brake were not installed, a high wind might roll the crane down the runway and cause serious damage.

Limit Switches: Selection of a proper limit switch for the hoist motion of the crane must be given due consideration, with an understanding that the limit switch is a safety device, and not to be used as a constant stopping device for the upper travel. Selection of a limit switch is determined by classification of the crane, as well as the hoisting speed, the length of lift, and the obstructions on the floor over which the crane must operate. This last item is quite essential, and brings to mind that, mechanically, the crane must be constructed so it will not be necessary to trip the limit switch

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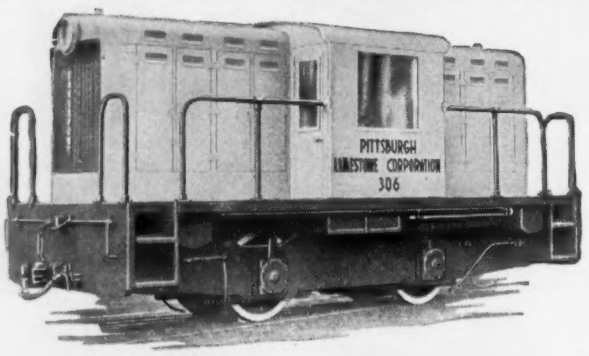

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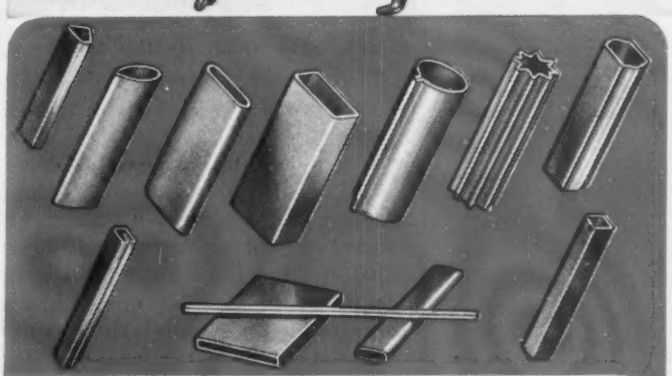

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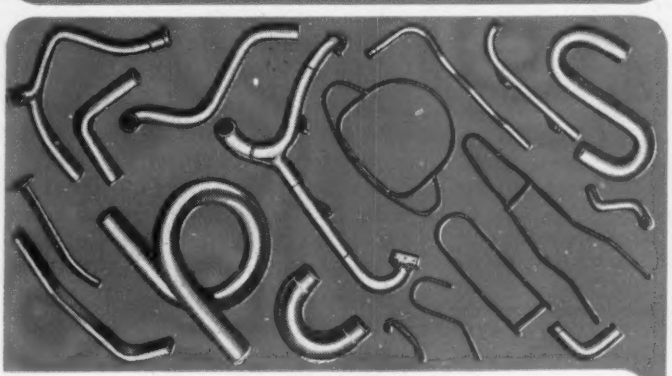

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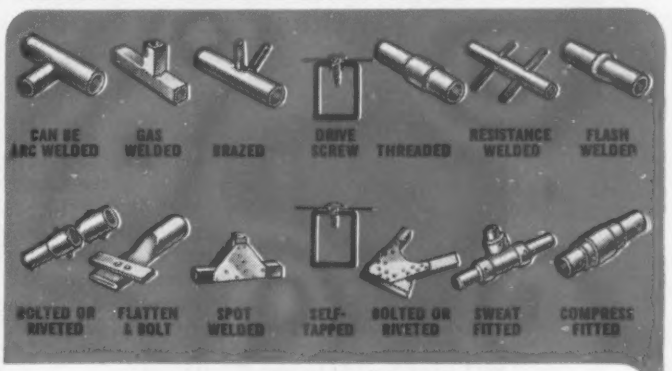

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on high lifts to move over these floor obstructions.

Fundamentally, there are two types of limit switches that can be used for either alternating or direct-current operation. The first classification (best for use with class 1, 2, and 3 cranes) is known as the control circuit type of limit switch which is connected in series with the operating coil of a limit switch contactor. The breaking of the limit switch circuit opens the circuit to the contactor coil, which in turn opens the power circuit to the motor.

Another type of limit switch, best used on class 4 and 5 applications, is the motor circuit type which is weight operated and mounted on the crane trolley. Contacts are connected directly to the power supply of the hoisting motor. On direct-current operating cranes, this quick break mechanism closes another set of contacts which connects the hoist motor together with a suitable resistance into the dynamic braking circuit. For alternating current installations, this same type of safety motor circuit limit switch can be used.

Switches to limit the travel of trolley or bridge motion are applied in some unusual operating conditions, but as a general rule, are not applied on the majority of cranes, inasmuch as they restrict the floor coverage of the crane. When applying limit switches to the bridge travel of a crane, for instance, the limit switch must break the circuit to the bridge motor, allowing the crane to stop within a distance equivalent to 10 per cent of the full load speed of the bridge.

Control: Experience of the crane builder, and buying habits of the customer are the usual methods in determining type of control to be used. Since the control is more or less the "brain" which controls the movements of the crane, it naturally must possess good speed regulating properties. It should provide a minimum of five steps of speed regulations, be designed in accordance with NEMA standards, and should be readily accessible for maintenance and replacement parts. It should be compact, well insulated, amply protected against shorts and grounds, provide ease of operation, and should be mounted to provide clear vision for the operator.

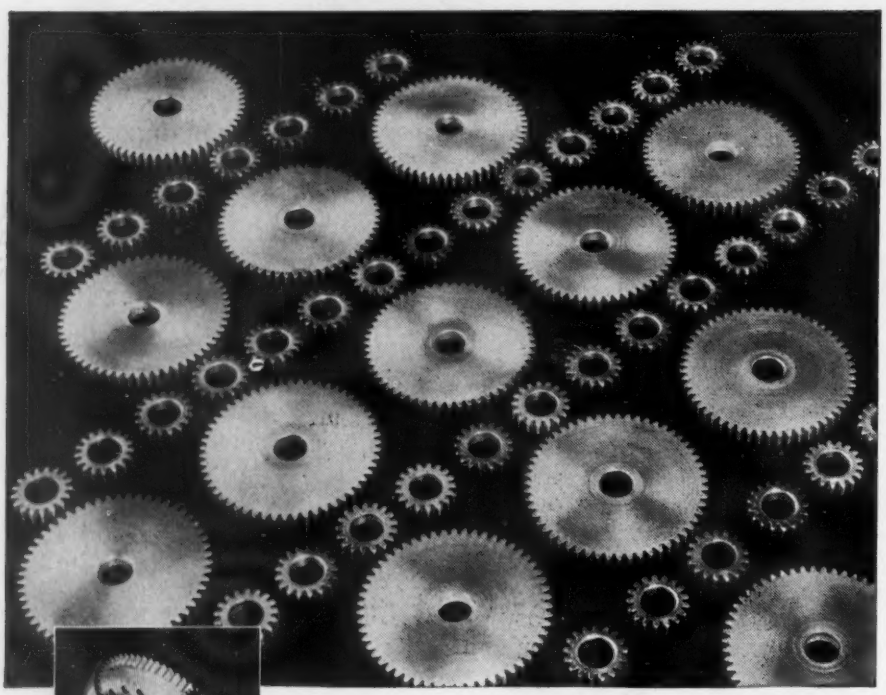
Fundamentally, there are three different types of control, namely; manual, semimagnetic, and full magnetic types, both for alternating as well as direct-current operation. Users of overhead traveling cranes appear to favor full magnetic control, which provides a higher initial cost but has the distinct advantage of having ease of operation and lower maintenance over a long period.

Manual type control of either face plate type or drum type is used on all cranes under classes 1, 2, and 3, provided that horsepower requirement for this control falls within the limiting factor. Limiting factors placed against the manual control are as follows:

For direct current, dynamic lowering hoist controllers, maximum 15 hp at 230 v dc; for reversing service, used on bridge and trolley drives, 40 hp at 230 v dc; and for alternating current, reversing service, for hoist, bridge, and trolley motions, the hoist motion used in conjunction with a mechanical load brake, 49 hp at 220 v ac.

For class 3 modern duty service, a semimagnetic type of control is recommended, and its adoption to either class 1 or 2 if the horsepower requirements are beyond the limitations outlined above. The limiting factors for the use of semimagnetic control are as follows: 40 hp for hoist dynamic lowering service at 230 v dc; 50 hp reversing service for bridge and trolley travel at 230 v dc; and for alternating-current operations, the semimagnetic control is suitable up to 75 hp, 220 or 440 v ac, for reversing service for either hoist, bridge or trolley motion.

For classes 4 and 5, full magnetic



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type of control is recommended for both alternating as well as direct current applications.

Under class 5, severe duty cranes, variations of the full magnetic control are applicable, particularly on the alternating-current operated cranes. Magnet and grab bucket cranes are not equipped with mechanical load brakes in the hoisting motion. Because of the severity of service, the use of a mechanical load brake becomes a decided maintenance problem. In such cases, counter-torque or regenerative type of control is recommended. Regenerative control provides a constant speed in the lowering direction when the control handle is operated from the full-on lowering toward the off-position by the use of secondary short circuit contactors, and is recommended up to 15 hp operation. Above that horsepower, counter-torque type of control, which provides an electrical slowdown when operating from the full-on lowering toward the off-position, with an overhauling load on the hook, is recommended.

In some cases, direct-current cranes under classes 3, 4, and 5 might demand the use of an electrical slowdown for the bridge or trolley motion. This is customarily done by providing an armature shunt point at the first step of the controller, or it can be done by providing a dynamic braking point on the controller. With a dynamic braking connection, however, it is necessary to add directional switches on the bridge drive so that the correct dynamic braking connection can be made, depending upon the direction in which the crane is operating.

Resistors: In conjunction with the proper selection of control for an overhead traveling crane, of equal importance is the selection of the proper resistors to operate with this control. Fundamentally, resistors can be classified in two different classes—namely, the cast grid, and the ribbon-wound resistors. Either one of the two resistance units gives equal performance on a crane. The nonbreakable feature of the ribbon-wound unit has its advantage, yet it possesses the disadvantage of not having the thermal capacity of the cast grid.

For overhead traveling cranes in class 1, where the lift is not too great and the cranes are equipped for pendant floor operation, NEMA class 130 or 140 resistance can be used. On long lift cranes in this classification, it is recommended that the 150 or 160 classification of resistance be used, with further thought being given to the fact that if loads must be lowered at reduced speeds with resistance in the circuit for a considerable length of time, heavy intermittent, or continuous duty, namely, 170 or 90 class resistors should be used.

For cranes in the class 2, light duty classification that are pendant floor operated, NEMA class 130 or 140 resistance can be used, but if these cranes are cab controlled, NEMA class 150 should be used.

For cranes in classes 3, 4, and 5, normally the resistance classification of 160 should be used. An exception to this rule, however, must be made depending upon the specific requirement of the crane.

Protective Panels: All alternating and direct-current operated cranes are provided with a motor protective device of some sort. It is recommended that this protection be installed by means of overload relays set to approximately 125 per cent current of the motor that they protect. Direct current operated cranes shall have one overload relay of the inverse time relay type inserted in each of the lines to the motor circuit which they control, and an instantaneous trip overload relay connected in the common line, this to provide short circuit protection.

In the case of alternating-current operated cranes, overload relays of the

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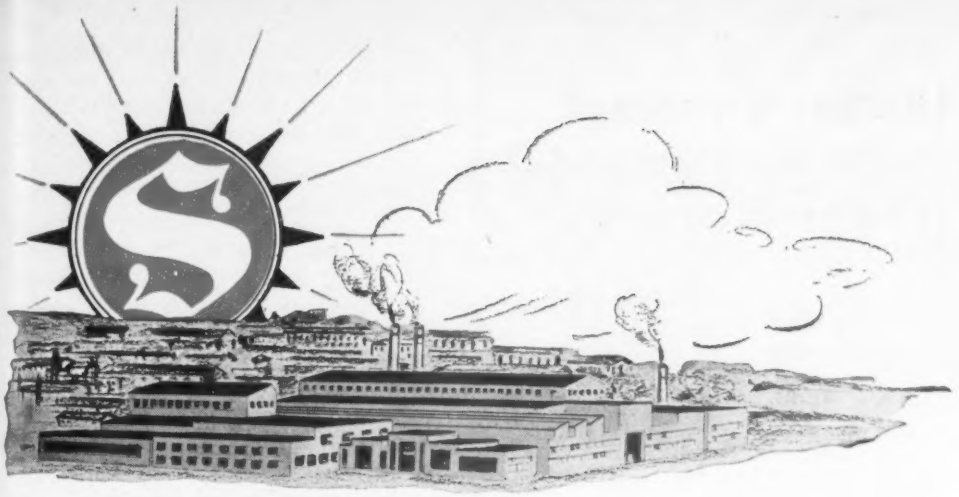

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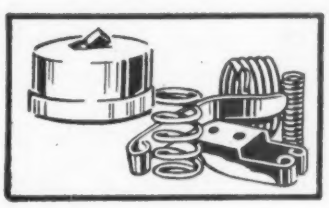

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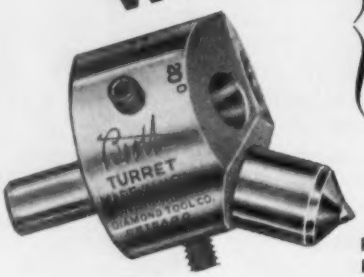

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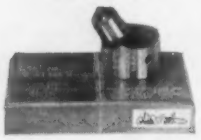

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From truck and car to stockpile and back to truck and car, this "bottleneck smashing" crane replaced one of another make and has piled up an enviable service record.

THE EUCLID CRANE & HOIST COMPANY
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WRITE FOR CRANE CATALOG

dual coil type, or single coil relays in each of two of the three power leads to the motor circuits are recommended. Such protection can either be provided in a seperate crane protective panel, or provided on the full magnetic control panel if the crane is so equipped. Selection of the crane protective panel which is customarily mounted in the crane cab at the rear of the operator is dependent upon the total horsepower load of the crane. The panel, however, should be provided with main line disconnect switch, that can be readily locked in the open position.

Economics as a Factor in Labor-Management Policy

Labor-Management Economics, by W. V. Owen; cloth, 121 pages, 5¼ x 8 inches; published by the Ronald Press Co., 15 East 26th St., New York, for $2.

The author's thesis is that a better understanding of economics by management and labor will improve the tone of industrial relations. The long-run success of management policies and programs as well as those of labor, are controlled to some extent by economic soundness.

The volume is intended primarily not for professional economists but rather for management and for labor leadership at all levels, who must deal with economic forces by reason of the nature of industrial processes and for those interested in such forces from the standpoint of the consuming public.

Outlines and diagrams are used to economize the reader's time, though they necessarily must present partial rather than complete pictures. The text is in two parts, the first dealing with employer-employee economics and the second with the economic framework.

Exhibition to Show Presses in Operation

A complete line of eight Warco presses will be exhibited by Warren City Mfg. Co. of Warren, O., subsidiary of Federal Machine & Welder Co., at National Metal Congress and Exposition at Atlantic City, November 18-22. Also planned is a display of typical metal pressings showing versatility of these presses, the latest type of which will be in operation at the company's exhibit.

—o—

A new cement with strong adhesive powers is announced by Kindt-Collins Co., Cleveland, for applying cloth-backed and flexible paper disks to steel disk grinding machines. Manufacturer reports that only a few minutes are required for removing worn disks and applying new ones with the cement. Offered in quart cans, it will not deteriorate when container is tightly closed.

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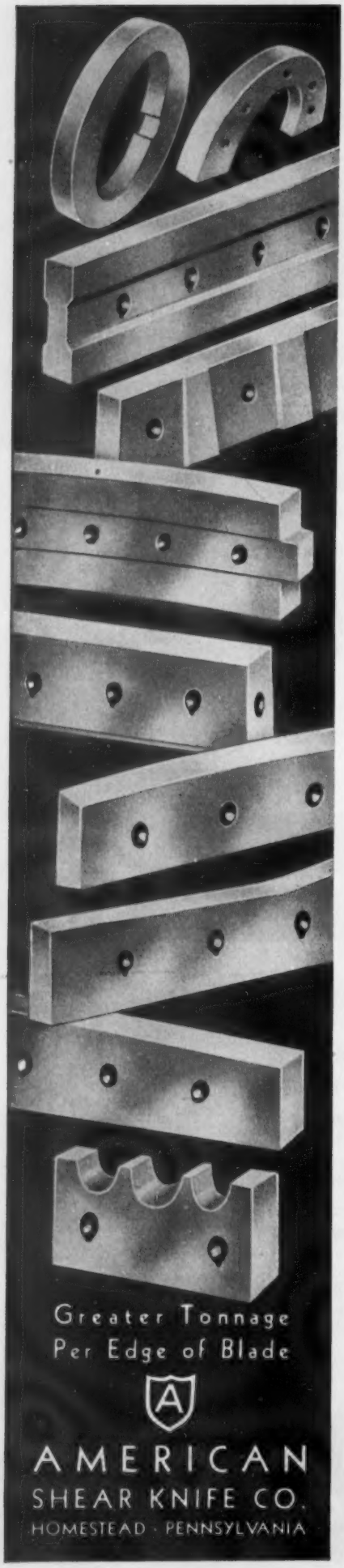

Automatic Stud Welding

(*Concluded from Page* 163)

the company's Lorain, O., and San Leandro, Calif., plants using special equipment designed by Nelson engineers. Mild steel screw stock is cut to length, chamfered and threaded in vertical screw machines, Fig. 5, equipped with two side arm tool holders for cut-off and forming tools. Collet opens once to allow gravity fed stock to drop to stop block which moves away to permit tools to operate. An opening die feeding upward cuts thread, and cutting tool lops off threaded stud.

After the first operation studs are cleaned in centrifuge spinner to remove all excess oil and metal particles. Studs then move on to the second operation machine to be drilled and counter-bored to create recess 1/16-in. deep which is later filled with flux. Stud drops through the collet to the stop block; the collet closes, stop block moves aside in time for elevator to rise, bore and drop; collet opens and stud falls into ejection chute.

Following cleaning after the second operation, heads of studs 5/16-in. and larger are filled with flux, capped and crimped on special automatic loading machines. As shown in Fig. 12, studs are hand fed into chambers on indexing work-holding table, automatically indexed under flux hopper, loaded, capped, and the walls of stud crimped to secure cap. Caps are punched from metal tape fed through a forming tool on the machine.

The Ohio plant's oil cleaning system consists of a centrifuge spinner, previously mentioned, which removes oil from parts. The oil then flows into a trough contructed with series of baffles to trap sediment, is pumped into 500-gal storage tank from which it is piped to another storage tank with feeder lines to individual machines. Valve at each machine enables operator to control flow.

Sealed Transformer Bushings Available

Multiple and single terminal style hermetically sealed transformer bushings are offered by General Ceramics & Steatite Corp., Keasbey, N. J. Current carrying capacities from 1 to 20 amp and voltage flashovers from 2000 to 40,000 v rms are being manufactured.

Made of Steatite glazed to stainless steel, the materials in combination are said to withstand not only 20 cycles of thermal shock from −55°C to +125°C., but will withstand shock of soldering bushings into place without setting up strains. Metal used in bushings is hot-tin coated. All are tested with air pressure at 50 psi.

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The part to be checked is mounted on a universal stage and its image projected on a screen in the upper part of the instrument. Measurements are checked either by placing a properly enlarged drawing on the screen and comparing dimensions, or by moving the part so that its image traverses a distance corresponding to the dimension to be checked. A quick and accurate answer is obtained to every question involving correct dimensions, angles and radii.

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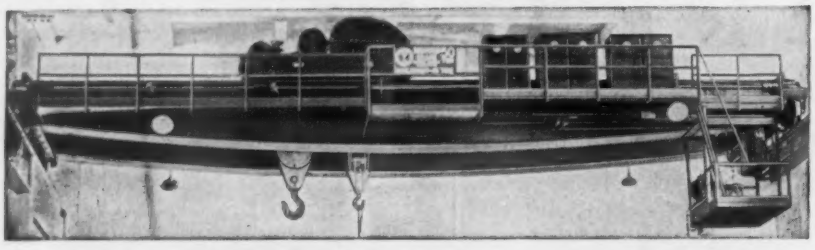

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NEW YORK AKRON DETROIT CHICAGO LOS ANGELES TORONTO

Induction Heating

(*Concluded from Page* 169)

ratio transfomer when changing to parts of widely different dimensions in order to utilize full power from the induction heating machine. The time-consuming inconvenience of changing transformers for each job is eliminated by Tocco's new variable ratio transformer, Fig 3, which enables different jobs to be accomplished at full power from the generator merely by changing tap connections. This transformer enables efficient matching of all type and sizes of induction heating coils. The new apparatus, made available as optional equipment for motor-generator type machines, has a range of voltage reduction ratios from 5:1 to 17:1. Its principal advantage is simplicity of operation. Changeover time is negligible—a matter of disconnecting and connecting the leads.

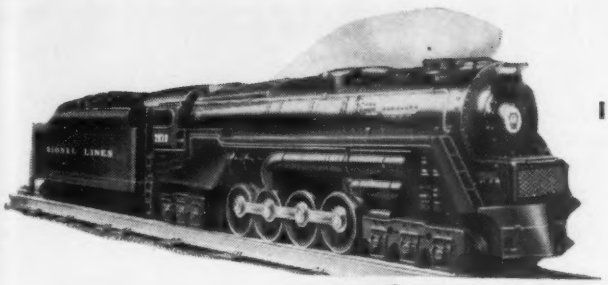
30,000 Cycle Machines: Although the maximum motor generator frequency limit of 10,000 cycles has been generally satisfactory for surface hardening parts over ⅜-in. in diameter, the range of standard induction heating machines is increased by the 30,000 cycle motor generator set, Fig. 4. This higher frequency power source, operating on the same principle as present motor generators, is expected to extend the applicability of motor generator type equipment to effective processing of smaller parts.

Thin Case Hardening: Where it is desirable to surface harden or efficiently heat parts of very thin cross sections of very small diameter, extremely high frequencies must be used. For such applications, Tocco has developed the new 3,000,000 cycle electronic tube set shown in Fig. 5. This machine has two work stations, is designed for 440 v, 60 cycle power, is rated at 7½ kw output, and supplements the company's present 450,000 cycle Toccotron unit.

Fluorescent Maintenance Manual Published

A manual containing details on fluorescent lamp operation and on various problems encountered in maintenance of fluorescent systems is offered by Sylvania Electric Products Inc., Salem, Mass. Text material covers trouble shooting, testing procedures and cleaning methods. Its illustrations and diagrams include those of circuits and test equipment which can be built in electrical shops.

Pocket-size manual, complete with index, also contains cross reference and a glossary of fluorescent lighting terms. It may be obtained from the company for $1.00.



INDEPENDENT INVESTIGATOR TELLS HOW . . .

LIONEL *gives Assembly a clear track*

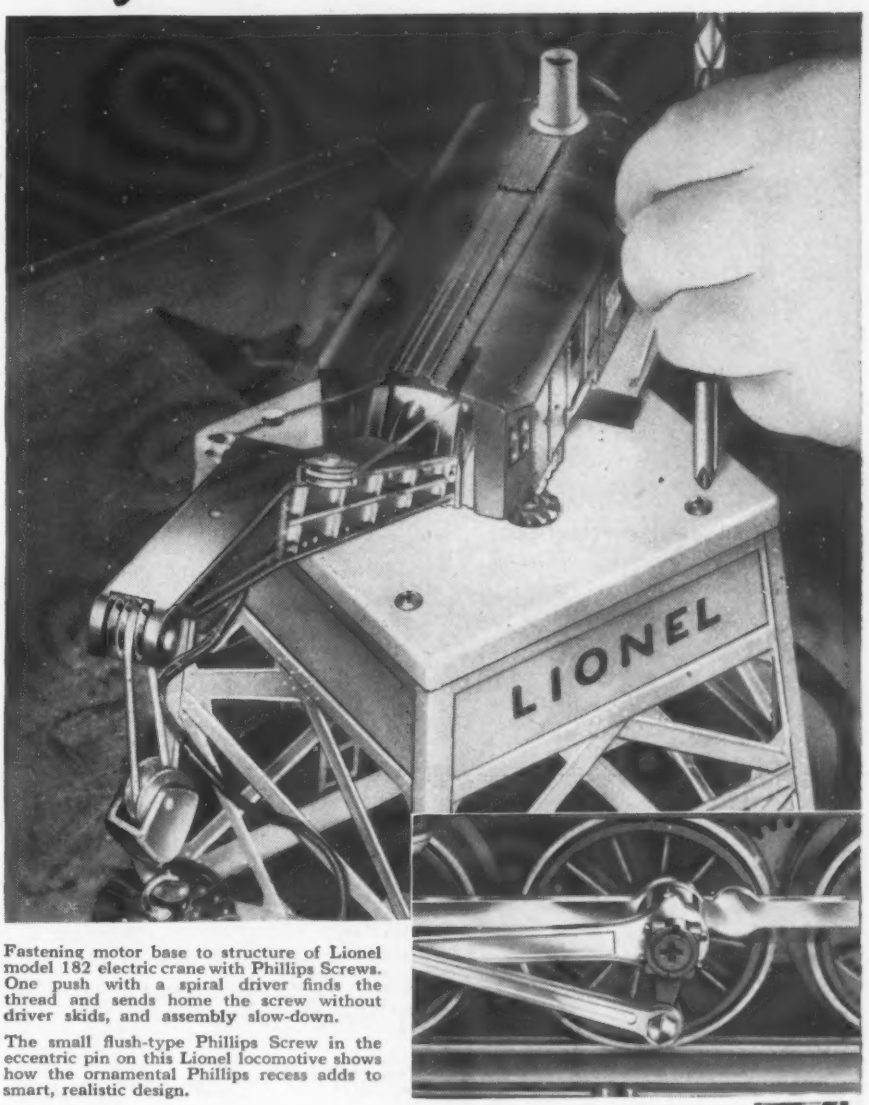
"We use Phillips Screws on 27 different products," Lionel's chief engineer told the Peck Co. investigator, on another study of assembly savings made by prominent manufacturers using Phillips Screws.

"PHILLIPS SCREWS ELIMINATE DRIVER SLIPS THAT USED TO COST A HALF MAN-HOUR EACH. On most parts for Lionel locomotives, cars, and accessories, the finish is applied before assembly, so that a driver slip meant disassembling the product and either junking the part or stripping off the paint for refinishing. The time lost would average about ½ man-hour per slip. This time is saved since we switched to Phillips Screws.

"PHILLIPS SCREWS MAKE DIFFICULT ASSEMBLIES EASIER, FASTER. Fastening the motor base inside the body of a model locomotive is one example. Space here is too small to allow holding a screw with the fingers. In many assemblies the space is too small to permit using even a screw holding attachment. Phillips Screws stay on the driver tip, make it a trouble-free, one-hand job.

"FINE APPEARANCE OF PHILLIPS RECESS IMPROVES APPEARANCE, and contributes to smart, modern design that appeals to our customers."

A WEALTH OF ASSEMBLY INFORMATION is available to you in the full report of this independent investigator's findings at the Lionel plant. Send for this and other reports, on metal, wood, and plastic products. Use coupon.



Fastening motor base to structure of Lionel model 182 electric crane with Phillips Screws. One push with a spiral driver finds the thread and sends home the screw without driver skids, and assembly slow-down.

The small flush-type Phillips Screw in the eccentric pin on this Lionel locomotive shows how the ornamental Phillips recess adds to smart, realistic design.

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26 SOURCES

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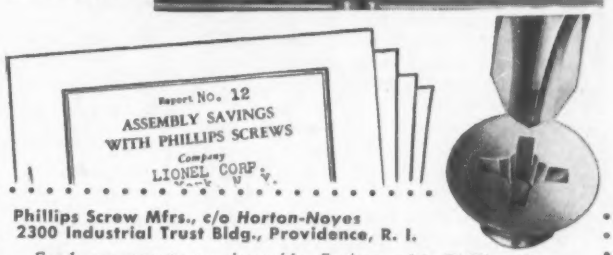

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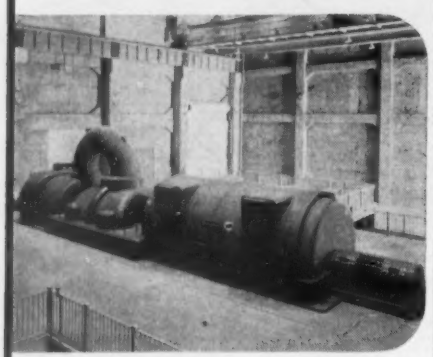
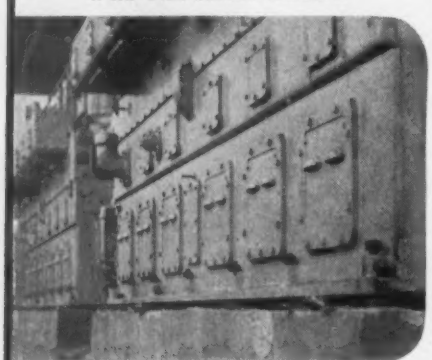


Large Turbo-Generator Unit Grouted With Non-Shrink Embeco.



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Pulsation Dampener To Be Exhibited in New York

Pulsation dampener that changes pulsative flow into a smooth, steady stream, is to be demonstrated in a working model in the exhibit of Fluor Corp. Ltd., of Los Angeles at the National Exposition of Power and Mechanical Engineering to be held in New York, December 2 to 7. According to the company, dampeners, when installed on either suction or discharge side of compressors, converts the pulsative flow into a steady stream, greatly reducing pipe line vibration and correcting horsepower losses and inaccurate orifice meter readings.

A small motor driven compressor with dampeners installed on both suction and discharge sides will be exhibited. A lever on either side will enable the spectators to route the flow through or around the device, the results being shown on a pressure gage and a pressure recording chart.

Industrial Adhesive Bonds Metals Foils

An industrial adhesive that requires no catalyst or special preparation for use, and which does not gel inside of a year has been developed for bonding metal foils and metal sheets to wood, plastics, and other substances having different coefficients of thermal expansion. Described as being tough and flexible by E. I. Du Pont de Nemours & Co. Inc., Wilmington, Del., it can be applied by brushing, roller or knife coating or dipping.

Adhesive contains 27.5 per cent solids and is insoluble in water, its bond strength being lowered by continued immersion. However, its original strength is recovered after removal from water. Dried film is said to be resistant to dilute alkalis, acids, and corrosive salt solutions. The company states that it is not attacked by petroleum or coal-tar solvents, lubricating oils, ethylene glycol or vegetable oils.

Stainless Welded at Low Base Metal Temperature

Flux-coated metal arc electrodes which permit alternating or direct-current welding of stainless steel at lower base metal temperatures are offered by Eutectic Welding Alloys Corp., New York. Deposits are said to have characteristics equal to or better than the stainless base metal, including high resistance to corrosion and oxidation. Electrodes are made in all sizes from 3/64 to 3/16-in. with diameter in three types for various types of steels.

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Density—lb. per cu. ft.	30	38	40	29	35	42	48
Transverse Strength—lb. per sq. in.	140	115	90	60	80	120	125
Cold Crushing Strength—lb. per sq. in.	400	700	300	70	115	170	190
Linear Shrinkage—Percent	1.4 @ 1600F	0.8 @ 2000F	2.0 @ 2500F	0.0 @ 2000F	0.0 @ 2000F	0.3 @ 2300F	1.0 @ 2600F
Reversible Thermal Expansion—Percent	0.1 @ 1600F	0.7 @ 2000F	1.3 @ 2000F	0.5—0.6 @ 2000F	0.5—0.6 @ 2000F	0.5—0.6 @ 2000F	0.5—0.6 @ 2000F
Conductivity at Mean Temperature	∥ ⊥						
500F	1.01 .67	1.67	1.70	.77	.97	1.51	1.92
1000F	1.13 .79	1.88	1.95	1.02	1.22	1.91	2.22
1500F	1.24 .90	2.08	2.19	1.27	1.47	2.31	2.52
2000F	— —	—	2.45	—	1.72	2.70	2.82
Recommended Service							
Back Up	1600F	2000F	2500F	2000F	2000F	2300F	2600F
Exposed	—	—	—	1600F	2000F	2300F	2600F
Recommended Mortar for Setting Brick	Sil-O-Cel Mortar	Sil-O-Cel Mortar	Sil-O-Cel Super Brick Mortar	J-M No. 1626 Cement	J-M No. 1626 Cement	J-M No. 1626 Cement	J-M No. 1626 Cement

Notes: 1. Above tests are in accordance with ASTM tentative standards.
2. Conductivity is expressed in Btu in. per hr per sq ft per deg F at the designated mean temperatures.
3. ∥ —with heat flow parallel to brick strata.
⊥ —with heat flow perpendicular to brick strata.

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The three J-M Insulating Brick provide great structural strength; the four J-M Insulating Fire Brick combine strength with exceptional resistance to spalling. All offer the advantages of light weight and low conductivity. They are recommended as back-up insulation or insulating fire brick for all industrial requirements.

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800 OUTSIDE ROOMS ALL WITH PRIVATE BATH . . . SINGLE FROM $2.50 . . . DOUBLE FROM $4.00

Charles H. Loth, General Manager

Wire Mill Dies

(*Continued from Page* 183)

drogen chloride. Water containing the latter then flows through an anion resin bed where the hydrogen chloride is absorbed by the resin leaving water partly or entirely free of sodium chloride.

Upon exhaustion, the ion-exchange resins are easily reactivated by passing a dilute acid solution through the bed of cation resin and a weak alkali through the anion bed. Ultimate replacement with the new resins is due only at long intervals. Some units have been in steady operation without renewal for many years.

Application of Tin as a Coating Material: Dr. B. W. Gonser, Battelle Memorial Institute, Columbus, O., in presenting this paper described how molten fluxes permit the addition of tin chloride which deposits a thin coating on the metal being treated and makes a fine mordant in dipping. He mentioned that zinc cadmium (20 per cent cadmium and 80 per cent zinc) is considered a good substitute for tin. In his opinion tin is becoming more available though he cautioned that it would be 1948 before an ample supply could be expected.

Manufacture of Steel for Basic Rope Wire: The author, R. D. Hindson, Steel Co. of Canada, Ltd., Hamilton, Ont., in describing the various steps stated that about 10 per cent of the total furnace charge or 20,000 lb of limestone is used. After this is in the furnace about 100,000 lb of scrap or 50 per cent of the metallic charge is added. Three hours later 100,000 lb of hot metal is put into the furnace. The scrap continues to melt. Slag forms on the surface of the bath.

Scrap usually is completely melted about 45 min after the hot metal is charged and then the lime boil starts. This boiling action thoroughly mixes the bath bringing the lime in close contact with the impurities as it rises to the surface to form the main constituent of the slag.

Two hours after the hot metal is charged, the lime boil subsides and the working period starts. This is perhaps the most important stage in the melting of a rope wire heat, because during this period the melter must shape up the slag so as produce satisfactory quality steel. Iron oxide in the slag is controlled by varying the viscosity and basicity of the slag.

After impurities in the charge have been oxidized and removed the steel is deoxidized by using a certain amount of 79 per cent ferromanganese. In order to remove all the iron oxide present in the bath 100 lb of aluminum is added about 8 min after the ferromanganese addition.

After the heat is tapped into the ladle

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Traffic congestion on main arteries in some of our major cities has reached a point where a solution must be found. But widening skyscraper-lined streets is too costly. So it has been proposed that highways be built through these skyscrapers—using them as supports for the roadways. In the world of metals, aluminum and magnesium—the new light alloys—are supplying the solution for many manufacturers in gaining lightness in their products with no sacrifice of strength. Many other advantages are also obtained by use of these versatile metals. Bohn engineers would like to discuss possible applications with you.

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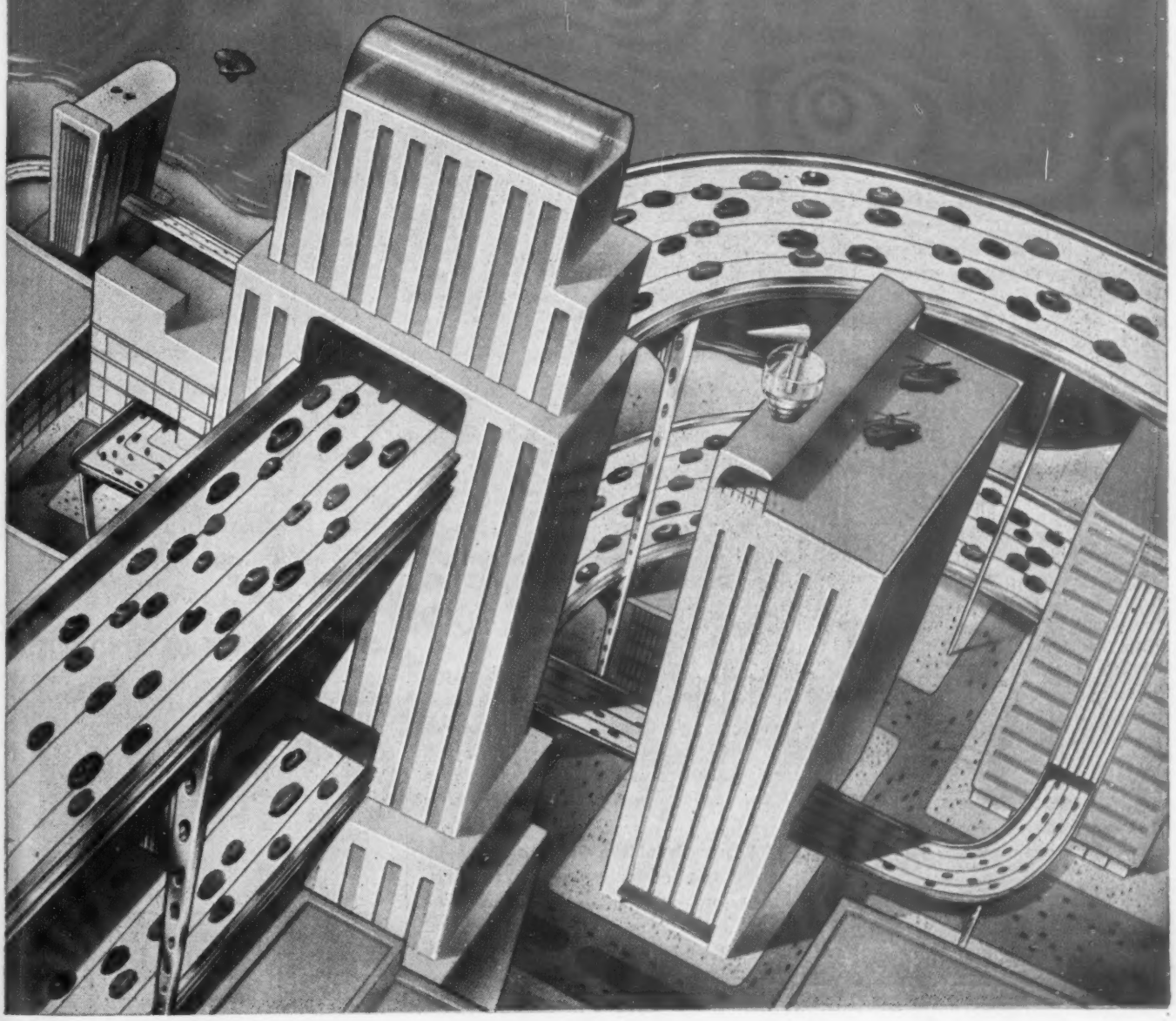

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Used as an undercoat before liming in high carbon rod-drawing operations, the Oakite CrysCoat Process produces a non-hygroscopic crystalline phosphate coating that serves as an effective rust retardant. That means less wire returned for re-cleaning and re-coating . . . better blue-gray color. By putting a parting layer between metal and die, the Oakite CrysCoat Process provides maximum die lubrication . . . often lengthens die life 150 to 300%. And because there's less oxidation, processed wire requires shorter pickling time!

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Ask your nearby Oakite Technical Service Representative for advice on this or any other cleaning problem. He'll gladly make on-the-spot tests and helpful recommendations. Just give him a call! Or, write for FREE Oakite CrysCoat Process Service Report which gives the step-by-step details of this rust-retarding process. On letterhead, please.

OAKITE PRODUCTS, INC.
34E Thames Street, New York 6, N. Y.
Technical Service Representatives Located in All Principal Cities of the United States and Canada

OAKITE *Specialized* **CLEANING**
MATERIALS • METHODS • SERVICE

ferrosilicon is added to bring the silicon content up to specification and about 3 lb per ton of calcium manganese silicon to further clean and degasify the metal. Approximately 9 to 10 hours are required to make a heat from the time material is charged until steel is tapped.

Steel is held in the ladle until the temperature drops to about 2760° F and is then poured through a 1¾ in. nozzle into 22 x 24 in. big-end-up molds equipped with metal hot-tops. The ingots average about 8400 lb. The interior surface of the molds is coated with tar in order to minimize slivers and seams.

Unusual Conditions Encountered in Cold Heading Products: F. W. Nobbs, chief inspector, Steel Co. of Canada, Ltd., Toronto, drew attention to the fact that forming of threads by rolling steel of circular section to about pitch diameter size between hardened dies has proven to be the most economical means of threading the majority of steel bolts. He attributed the economy to high speed of processing, saving of material, and the long die life. Roll threads have higher ultimate strengths and fatigue resistance than cut threads. Threads rolled after heat treatment have a higher fatigue resistance than those rolled before heat treatment. Increased fatigue resistance due to roll threading after heat treatment generally is attributed to the following:

1. Slight surface defects such as pitting or scaling resulting from heat treatment process are largely eliminated by subsequent working of the metal.

2. Surface of the metal is work hardened during rolling and thus tensile strength of the surface is increased. This would be especially effective where decarburization of the metal is affected during heat treatment. Where the latter is done subsequent to roll threading, the work hardening effect is lost.

3 Cold working of metal results in setting up of residual compressive stresses in the thread which act in a compensatory manner to tensile stresses encountered in service.

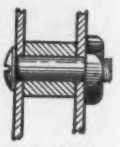
The author found that roll threading after process annealing gave higher ultimate strength values than rolling threading prior to such treatment. Process annealing temperatures have a marked effect upon the resultant ultimate strength properties of the threads. The speaker also found in using modern type furnaces combined with good practice that effective process annealing treatments can be carried out at lower temperatures than previously were considered possible.

—o—

A new soluble cutting oil and an easily brushed or sprayed gear lubricant are announced by Texas Co., New York. Oil is said to have excellent cooling properties of soluble oils combined with high-speed cutting characteristics of sulphurized mineral oils.

FASTENING PROBLEM:

Simplify fastening of double back wall sections of gas stove. Old way is awkward. (Air must circulate freely around chimney to reduce fire hazards.)



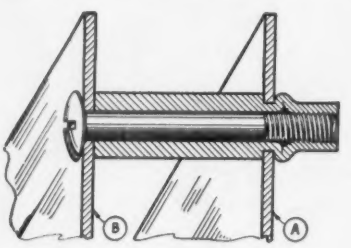
OLD WAY

★ ★ ★

SOLUTION:

This **RIVNUT**

used like this...



10-24 thread aluminum Rivnuts with ½" spacer heads were inserted in sheet "A" and upset. Outer wall "B" was placed with holes matching hollow threaded shank of Rivnuts. Screw attachments were entered in holes and tightened. Air circulated freely, fire hazards were reduced—Underwriters' regulations satisfied. There were no awkward reaches with hard-to-handle tools. Rivnuts adaptability easily answered this problem. Perhaps it could solve yours?

NEW "RIVNUT DATA BOOK"

This new edition places complete Rivnut facts at your fingertips. How to install, uses, types, test data, tools. Write today for your copy to The B. F. Goodrich Company, Dept. S-11, Akron, Ohio.

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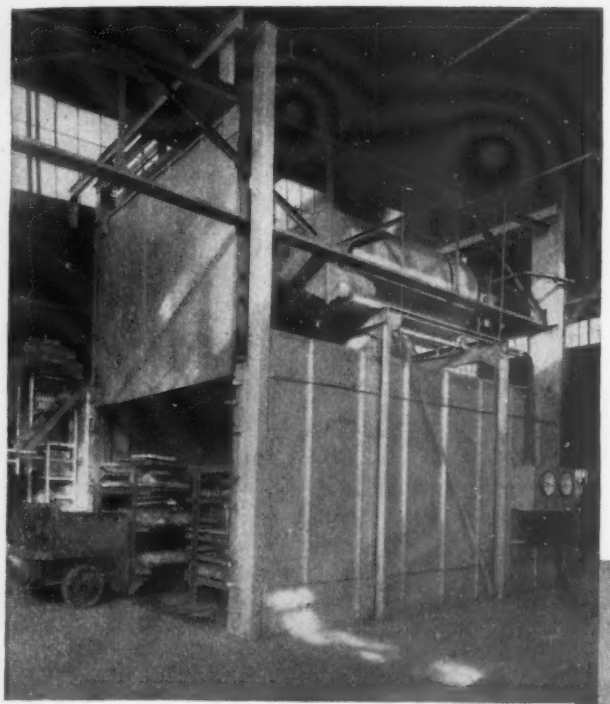
RIVNUTS

It's a rivet—It's a nutplate

INDUSTRIAL OVENS and FURNACES...

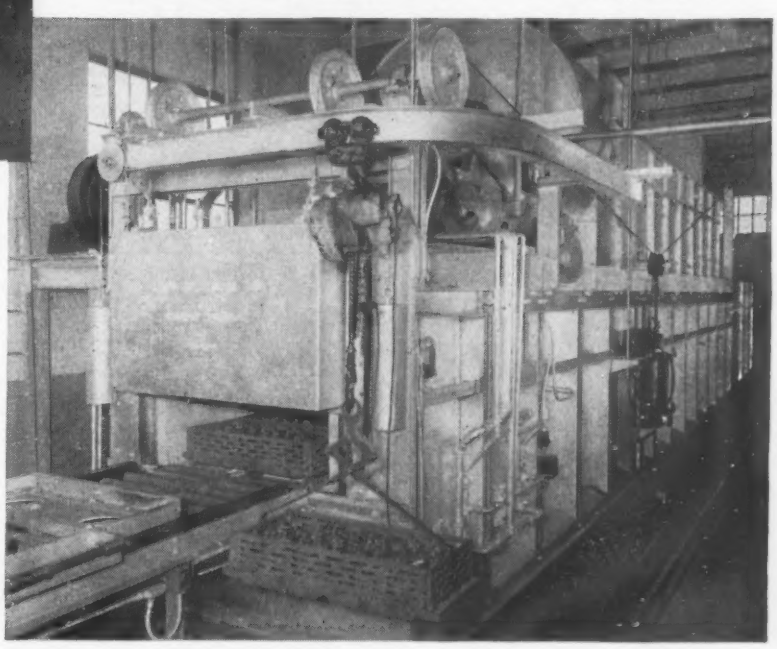
"Tailored" to your requirements



For 53 years Maehler engineers have specialized in designing and building industrial ovens and furnaces to meet industry's specific needs. In developing and perfecting the recirculating air heat system The Paul Maehler Company offers industry a line of ovens and furnaces that provide a degree of heat uniformity hard to match. This kind of temperature control assures the user of lower operating costs, greater production and better results.

Whatever your requirements are...heat treating, core baking, enameling, etc.... remember Maehler builds a complete range of oil fired, gas-fired and electrically heated ovens and furnaces to fit your particular needs. For higher production and lower operating costs call a Maehler engineer. There is no obligation.

The photo above shows a typical Maehler Lift Door Core oven installation. This oven means better cores, baked faster and at lower cost. The view at the right shows a Maehler-engineered air draw furnace used to anneal gray iron castings at the Chambers, Bering Quinlan Co.



MAEHLER

THE PAUL MAEHLER COMPANY

2208 W. Lake Street Chicago 22, Illinois

Industrial Ovens and Furnaces for Core Baking, Mold Drying, Heat Treating, Enameling, etc.

The Business Trend

New Postwar High Set By Industrial Activity

A NEW postwar high mark for industrial activity was registered on STEEL's industrial production index for the week ended Nov. 2. At 158 per cent (preliminary) of the 1936-1939 average of 100, the new peak exceeded by 3 points the previous postwar high of 155 per cent which had prevailed in the weeks ended Oct. 19 and 26.

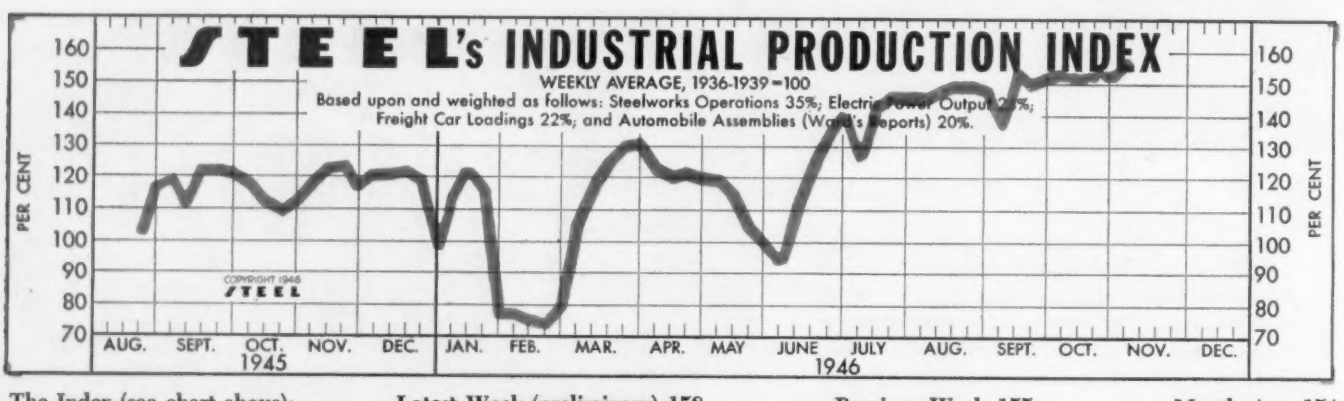
STEEL—Helping raise the index was steel ingot production, which in the week ended Nov. 2 rose to 91 per cent of capacity, highest rate since the war. Pressure for sheets and strip is still far ahead of supply but demand for fabricated structural steel dropped in September to the lowest level of the year largely because of government limitations on nonhousing projects, and high construction costs. Bookings of fabricated structural steel in September were estimated at 113,658 tons, compared with 164,728 tons in August and 235,817 tons in January, high month thus far this year. Shipments in September totaled 135,835 tons, compared with 152,944 tons in August.

AUTOS—Also contributing to the new high level of industrial production was automobile output, which in the week ended Nov. 2 set a new high with assemblies totaling 93,268 passenger cars, trucks and busses, compared with 87,680 in the preceding week.

CAR LOADINGS—Among recent new postwar records is the loading of 942,257 freight cars during the week ended Oct. 26. That was the highest weekly volume since the week ended Oct. 25, 1930. The current high rate of loadings is significant when the number of serviceable freight cars is considered. Today there are only 1,672,474 serviceable cars, compared with 2,117,789 in 1930. Total current tonnage loaded also is significant, in that capacity of a freight car today is 51 tons, compared with only 47 in 1930. Although car loadings in recent weeks have been at new postwar high levels the volume of freight traffic, measured in revenue ton-miles, handled by class 1 railroads in the first nine months of 1946 was 19.4 per cent below that for the corresponding period of 1945. Volume of freight traffic in September was 5.4 per cent below that of August and 1.1 per cent below that of September, 1945.

MOTOR FREIGHT—Volume of freight transported in September by motor carriers also declined from the August level. The decline, 11.1 per cent, was said to be the result primarily of strikes in the northeastern part of the country. Index of motor freight loadings in the first nine months of 1946 was slightly above that for the first nine months of 1945.

BUSINESS FAILURES—The rise in the number of business establishments since the end of the war is being accompanied by an increase in the number of failures. In the week ended Oct. 24, the number of commercial and industrial failures rose to the highest weekly level in over two years and put total failures thus far this year 23 per cent ahead of the corresponding period of 1945.



The Index (see chart above): **Latest Week (preliminary) 158** **Previous Week 155** **Month Ago 154**

FIGURES THIS WEEK

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)‡	91	90	90.5	73
Electric Power Distributed (million kilowatt hours)	4,600†	4,602	4,478	3,899
Bituminous Coal Production (daily av.—1000 tons)	2,077	2,085	2,100	2,036
Petroleum Production (daily av.—1000 bbls.)	4,700†	4,730	4,737	4,318
Construction Volume (ENR—Unit $1,000,000)	$109.4	$55.2	$133.7	$87.8
Automobile and Truck Output (Ward's—number units)	93,268	87,680	91,925	27,320

* Dates on request. ‡ 1946 weekly capacity is 1,762,381 net tons. 1945 weekly capacity was 1,831,636 net tons. † Preliminary.

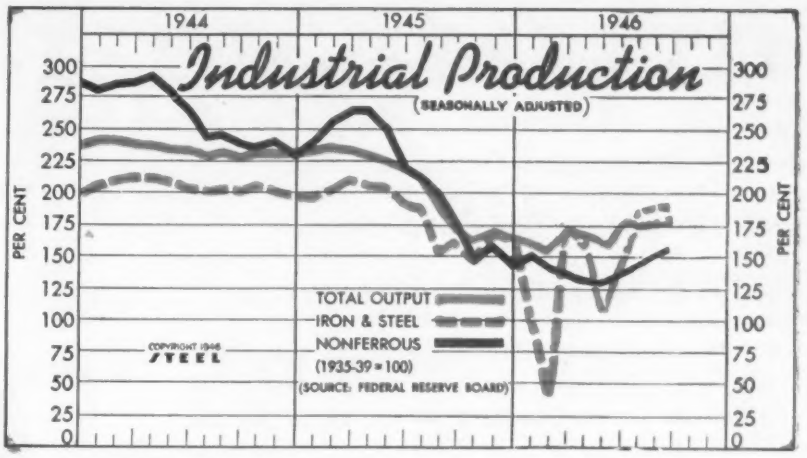
TRADE				
Freight Carloadings (unit—1000 cars)	940†	942	906	852
Business Failures (Dun & Bradstreet, number)	22	33	28	17
Money in Circulation (in millions of dollars)‡	$28,588	$28,585	$28,526	$28,026
Department Store Sales (change from like week a year ago)‡	+23%	+24%	+23%	+12%

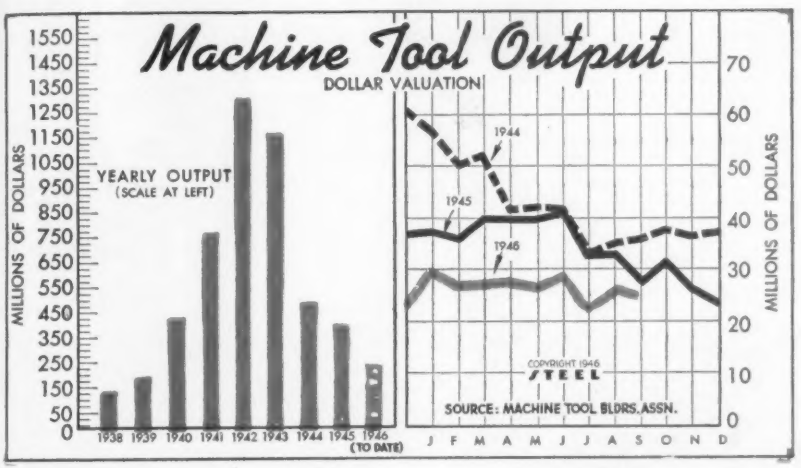
† Preliminary. ‡ Federal Reserve Board.

Federal Reserve Board's Production Indexes

(1935-39=100)

	Total Production		Iron, Steel		Nonferrous	
	1946	1945	1946	1945	1946	1945
Jan.	160	234	102	197	151	253
Feb.	152	236	43	202	139	257
Mar.	168	235	169	210	141	267
Apr.	165	230	159	206	132	263
May	160	225	109	204	130	248
June	170	220	154	192	135	219
July	172	210	179	187	143	196
Aug.	177	186	183	155	154	165
Sept.	177	167	184	163	160	139
Oct.	...	162	...	146	...	144
Nov.	...	168	...	167	...	148
Dec.	...	163	...	164	...	147
Avge.	...	203	...	183	...	204





Machine Tool Shipments

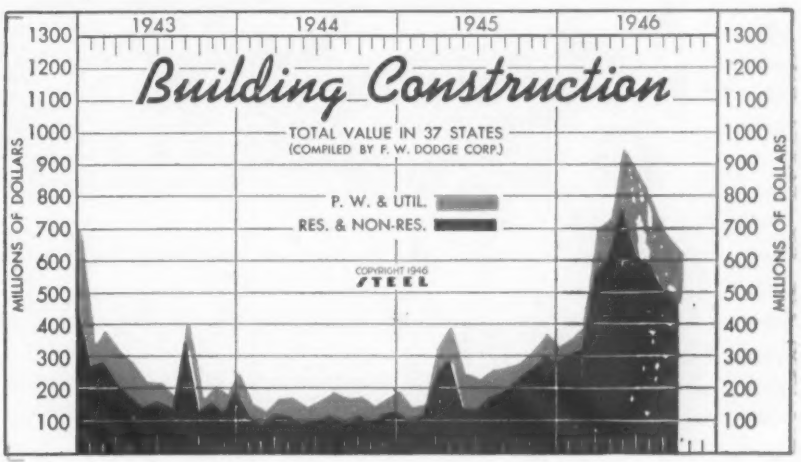
(000 omitted)

	1946	1945	1944	1943
Jan.	$30,263	$37,353	$56,363	$117,384
Feb.	26,949	36,018	50,138	114,594
Mar.	27,326	40,045	51,907	125,445
Apr.	28,108	40,170	41,370	118,024
May	26,580	39,825	41,819	113,859
June	28,580	41,040	41,471	108,736
July	22,360	32,504	32,753	97,541
Aug.	26,911	32,500	35,177	87,805
Sept.	25,468	27,300	35,889	85,842
Oct.	.....	31,200	37,516	78,302
Nov.	.....	26,000	36,277	71,811
Dec.	.....	23,200	36,784	60,873
Total	.....	$407,155	$497,464	$1,180,216

Construction Valuation in 37 States

(Unit—$1,00,000)

	Total	Public Works-Utilities		Residential and Non-Residential	
	1946	1946	1945	1946	1945
Jan.	357.5	50.2	39.8	307.3	101.2
Feb.	387.4	64.7	32.0	322.7	115.0
Mar.	697.6	143.6	90.6	554.0	238.3
Apr.	734.9	128.1	111.9	606.8	283.9
May	952.4	197.9	107.9	754.6	134.6
June	807.9	202.5	95.0	605.5	132.3
July	718.0	153.1	89.9	564.9	167.8
Aug.	679.9	184.4	77.5	495.6	186.1
Sept.	619.9	156.4	54.6	463.5	223.6
Oct.	....	....	61.1	....	255.5
Nov.	....	....	74.0	....	296.0
Dec.	....	....	51.0	....	279.7
Total	....	....	885.3	....	2,414.0



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$11,527	$12,862	$12,432	$11,376
Federal Gross Debt (billions)	$263.8	$263.7	$263.8	$262.4
Bond Volume, NYSE (millions)	$30.3	$19.8	$24.0	$36.3
Stocks Sales, NYSE (thousands)	8,224	4,715	5,115	9,464
Loans and Investments (billions)	$58.8	$58.3	$59.1	$61.0
United States Gov't. Obligations Held (millions)†	$39,619	$39,230	$39,990	$45,458

† Member banks, Federal Reserve System.

PRICES

STEEL's composite finished steel price average	$64.45	$64.45	$64.45	$58.27
All Commodities†	135.9	135.1	124.4	105.7
Industrial Raw Materials†	153.0	146.3	143.6	117.4
Manufactured Products†	131.7	133.7	117.5	101.9

† Bureau of Labor Statistics Index, 1926=100.

A CHUMP MEETS THE CHAMP

Old Man Hole (a mean old soul)
was digging away with glee.
He was boring a furnace bottom
when MAGDOLITE got 'im,
so the Champ beat the chump as you see.

Bet your "BOTTOM DOLLAR" on
Baker's MAGDOLITE
and WIN!

5 ways better
COMPOSITION
QUALITY
STRENGTH
PREPARATION
ECONOMY

Preventing holes in furnace bottoms continues to make MAGDOLITE famous. But be careful to avoid substitutes . . . only BAKER manufactures MAGDOLITE, the Original Dead-Burned Dolomite for economical Open Hearth and Basic Electric Furnace maintenance. Order BAKER'S MAGDOLITE and watch the difference!

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Advertisement

NOVEMBER, 1946

COPPER ALLOY BULLETIN

REPORTING NEWS AND TECHNICAL DEVELOPMENTS OF COPPER AND COPPER-BASE ALLOYS

Prepared Each Month by Bridgeport Brass Co. "Bridgeport" *Headquarters for BRASS, BRONZE and COPPER*

Importance of Annealing for Ductility Control

Before the development of the metallurgical microscope for studying the structure of metals and alloys, metal workers were severely handicapped because the surface appearance of the metal gave no indication of its internal structure. To judge the temper of a sample of metal which was to be duplicated in quantity the mill superintendent tried to make as good a guess as possible by bending the sample between his fingers. Then he proceeded to make up a small lot and submitted it to the customer for trial. When the report came back that the sample was either too soft or too hard he prepared another trial lot and often a third until the customer was satisfied. The superintendent then carefully recorded in detail the process required to produce the satisfactory temper and called the material shoe hook brass, lamp burner brass, butt brass, clock brass, etc., depending upon its application.

With mass production methods still in their infancy accurate control of quality or uniformity was not needed. Today machine speeds are many times faster while operations are fewer and more severe. Fortunately the fabrication of copper-base alloys has more than kept pace with improvements in metal working machinery. This was well illustrated in World War II in connection with the manufacture of the 75 mm artillery cartridge cases from brass. In the first World War six drawing operations were required. In World War II this was cut down to four draws with correspondingly fewer annealing operations. Speeding up had been accomplished because the metal was more ductile and more powerful drawing equipment was available.

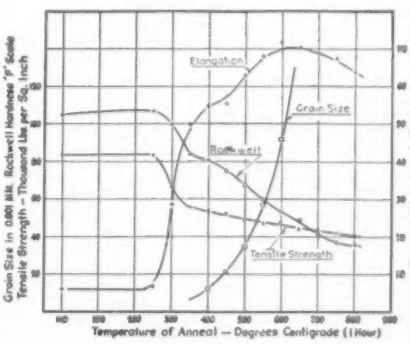
Effect of Annealing

Work hardened metal is softened by annealing, that is, by raising the temperature of the metal high enough to affect its microstructure. Varying degrees of softness are obtained by controlling the temperature of the metal in the furnace and by the length of time it is exposed to the heat. Under the microscope a piece of annealed metal that has been prepared by polishing and etching for microscopic examination appears to be made up of irregularly shaped crystals or grains. In general, it will be found that the higher the temperature of annealing the larger the crystals, the softer the metal, and the greater its elongation or ductility.

The microstructure of 70–30 brass, annealed at various temperatures, is here illustrated. It will be noted that the grain size of annealed metal is related to such physical properties as tensile strength, elongation and Rockwell hardness as illustrated in the curve (Fig. 1) which shows that the work hardened metal softens rapidly between 300° and 350° C. where re-crystallization takes place. The greatest ductility is obtained at about 650° C. It should also be noted from the curve that the greater the ductility the lower the tensile strength.

The size of the grain has a direct bearing on the appearance of the article if the metal is subjected to stretching when forming or drawing operations are involved. When the grains are large, the stretched metal is known to have a roughened or an "orange peel" surface. Metal of the same gauge but having a fine grain size will have a comparatively smooth surface after going through the identical operations which produced a rough surface on the coarse grained metal. Since the surface must be cut down during the polishing operation when a buff finish is required, it follows that a metal with the rough surface will require a longer period of polishing. In order to economize in materials, there is a tendency to use lighter gauges. In general, lighter gauges are annealed to have a finer grain structure than heavy gauge metal. This is helpful on severe drawing operations where a combination of strength and ductility are required.

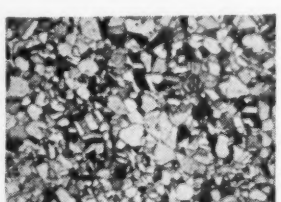
Fig. 1. CHARACTERISTIC ANNEALING CURVES 70–30 BRASS


Elongation
Grain Size
Rockwell
Tensile Strength
Grain Size in .000 MM. Rockwell Hardness "F" Scale
Tensile Strength – Thousand Lbs. per Sq. Inch
Percent Elongation in 2 Inches
Temperature of Anneal – Degrees Centigrade (1 Hour)

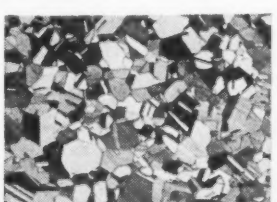
In the period when labor costs were considerably lower, less attention was given to the structure of metals with the result that the average grain size for annealed material, as supplied by the brass mills, ranged between .065 mm and .090 mm. At the present time while the average grain size is about .045 mm much material is supplied with a grain size ranging from .020 to .045 mm. Since every manufacturer wishes to reduce the cost of the polishing operation as much as possible he uses material with as fine a grain as will give sufficient ductility to withstand the necessary operations without breaking. Brass today is made to very close tolerance for both gauge and grain size limitations as well as composition in order to be suitable for modern high speed methods involving lowest costs. To obtain such quality modern mills must use only the finest annealing furnaces and temperature control equipment and must supervise processing under laboratory control.

Fabricators of metal goods who perform annealing operations in their own plants

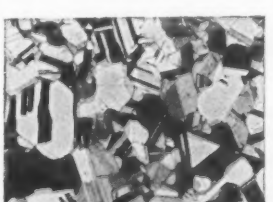
(*Continued on Page 2, Col. 2*)



.025 MM Grain Size



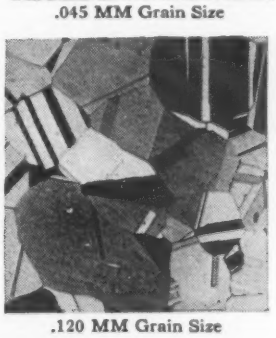
.035 MM Grain Size



.045 MM Grain Size

.065 MM Grain Size

.090 MM Grain Size



.120 MM Grain Size

Magnified 75x. Showing average diameter grain size standards as determined by American Society for Testing Materials. Etched by ammonium hydroxide and hydrogen peroxide.

COPPER ALLOY BULLETIN

CAUSES OF CORROSION

This article is one of a series of discussions by C. L. Bulow, research chemist of the Bridgeport Brass Company.

EFFECT OF STRESS ON CORROSION

It appears advisable at this time to summarize briefly the various ways by which cracking failures may occur in metals. We have already considered in this column a number of ways in which stress and corrosion operate together to accelerate cracking. In the outline which follows, it should be noted that considerable time has been spent in discussing items 1 to 4 inclusive.

Production of Cracks in Metals

1. Stress Corrosion
2. Season Cracking
3. Fatigue
4. Corrosion—Fatigue
5. Stress Cracking
   (a) Straight Tensile
   (b) Creep
6. Impact (Izod—Charpy: Water-hammer)
7. High Pressure (a) Gas or Liquid at low or elevated temperatures (b) Freezing water
8. Cold or Hot Working
9. Changes in microstructure
   (a) Volume change due to phase change
   (b) Volume change due to allotropic change
   (c) Local depletion of alloying element (example, chromium carbide precipitation in stainless steel)
10. Molten Metals
11. Reaction of Gases at Elevated Temperatures

Effect of Tensile Stress

Most cracks develop as a result of tensile stresses. A familiar laboratory example is the fracture obtained during the tensile testing of materials where metals are rapidly pulled to destruction.

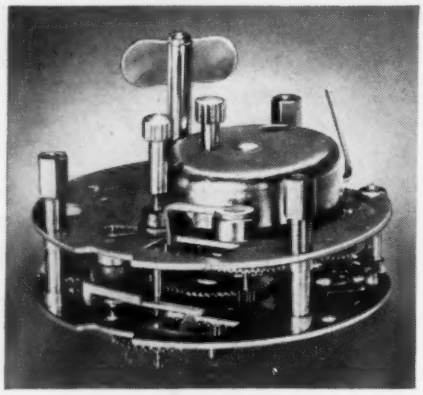
Effect of Creep

A comparatively low tensile stress acting over a long period of time, may lead to creep fractures. The time required to produce cracks decreases with rising temperature.

Effect of Impact

If the tensile stress is very rapidly applied as through a blow or impact (Izod and Charpy Impact Tests, or "water hammer") the metal may fail at the first shock or after a number of shocks or blows. A corrosive fluid flowing through a pipeline may, through its corrosive action weaken the metal and shorten the number of blows which the pipe or fitting may stand before rupture occurs.

In the next issue, we will discuss effects of High Pressures, Cold and Hot Working, Changes in Microstructure, Molten Metals, Reaction of Gases at Elevated Temperatures.



Bridgeport Clock Brass

The addition of lead to brass greatly increases its machinability and under the microscope lead is found scattered throughout the brass in the form of tiny particles which cause the chips to crumble and therefore aid in machining. Illustrated is a clock movement manufactured by the New Haven Clock Company, New Haven, Connecticut, from Bridgeport's clock brass. This material is cast in modern electric furnaces, processed with modern equipment and laboratory controlled to proper specifications. Bridgeport's clock brass is free machining, blanks easily, and is supplied flat and straight and with the proper temper for making watch and clock wheels; clock and instrument frames; thin, flat nuts, ratchets, butts, keys and blanks that require machine drilling, tapping, broaching and milling.

Importance of Annealing for Ductility Control

(Continued from Page 1)

should pay special attention to annealing temperatures and grain structure in order to keep their finishing costs at a minimum. Although a knowledge of practical metallography has filtered into plants of metal fabricators, nevertheless, our laboratory is quite frequently called upon for help to straighten out conditions involving grain size control.

More data on the structure of metals and copper-base alloys can be found in Bridgeport's Technical Handbook, which is available on request made on company stationery.

NEW DEVELOPMENTS

This column lists items manufactured or developed by many different sources. None of these items has been tested or is endorsed by the Bridgeport Brass Company. We will gladly refer readers to the manufacturer or other sources for further information.

Tapping Attachment—Incorporated in one of three positions of company's drill press turret head, reversing tapping head permits drilling and tapping in one operation at same station. Designed for high speed operation, manufacturer states tapping head has capacity of No. 8 to ½ inch in brass, to ⅜ inch in cast iron, and to ⅝ inch in steel. **No. 725**

Dial Comparator has been announced which can use any standard AGD lug type back dial indicator. It is said to be suitable for wide variety of work because of extensible indicator support arm and tapped holes in platen. Indicator support arm can be slid up or down on vertical column and swung to any angle in horizontal or vertical plane to place indicator at desired distance from column. **No. 726**

New Feed Water Test Kit is being offered for testing boiler feed water for hardness, alkalinity and chloride content. Said to contain solutions and precision-made pipette droppers for accurate measurements. Kit housed in portable cabinet 10 x 10 x 4¾ inches. Can also be modified to permit testing of sodium sulfite in boiler water. **No. 727**

Insulation Stripping Tool has recently been announced and is said to be capable of stripping insulation from electric wire and cable without nicking of wire or cutting of strands. Can handle solid or stranded wire in sizes from No. 22 to No. 10. Also available in other sizes with wire cutter blade on one side. **No. 728**

New Tubing Bender now available with capacity of ⅜ to 1½-inch ferrous or nonferrous tubing. Hydraulically operated, manufacturer claims from one to ten bends can be made in single length of tubing with only one setting. Designed for production bending operations requiring multiple bends per tube and duplicate parts. **No. 729**

Thermostatic Water Mixer has been announced which is claimed to be particularly useful in process plants where water temperatures must be controlled within close limits. Mixer delivers water up to 190° F. Capacities are 6 and 10 gallons per minute with water at 45 pounds pressure. Available for exposed or concealed piping. **No. 730**

Surface Finishes of metals, glass, plastics, paper, plated and painted products can be checked accurately from less than 1 to 5000 microinches according to manufacturer of new Surface Analyzer. Fine diamond point and power driven pickup, provides instantaneous chart record on magnetic direct-inking oscillograph of "peak and valley" profile of surface finish. **No. 731**

BRASS, BRONZE, COPPER, DURONZE, NICKEL SILVER, CUPRO NICKEL

Warehouse Service in Principal Cities

STRIP AND SHEET—For drawing, stamping, forming, spinning. Leaded alloys for machining, drilling, tapping. Silicon bronze, phosphor bronze for corrosion resistance. Alloys suitable for springs. Engravers' copper and brass.

WIRE—Cold Heading alloys for screws, bolts, nuts, nails, fastenings, electrical connectors, Phono-Electric trolley and contact wires.

ROD—Alloys for screw machine operation. Duronze III high strength, corrosion-resistant, good for machining and hot forging. Hot forging and cold heading alloys. Welding Rods. Copper-covered ground rod.

TUBING—For miscellaneous fabrication. For condensers and heat exchangers. For water, air, oil and hydraulic lines.

DUPLEX TUBING—for conditions too severe for a single metal or alloy.

PIPE—Brass and copper for plumbing.

FABRICATED GOODS—Plumbing brass goods. Radiator air valves. Aer-a-sol insecticide dispensers. Automobile tire valves.

TECHNICAL SERVICE—Staff of experienced, laboratory-trained men available to help customers with their metal problems.

WAREHOUSE SERVICE—Warehouse and jobbers stocks available for prompt delivery in principal cities.

TECHNICAL LITERATURE—Manuals and handbooks available for most products.

"Bridgeport" BRASS CO.

BRIDGEPORT BRASS

BRIDGEPORT BRASS COMPANY, BRIDGEPORT 2, CONN. • ESTABLISHED 1865

Shift in Political Power To Hasten End of Controls

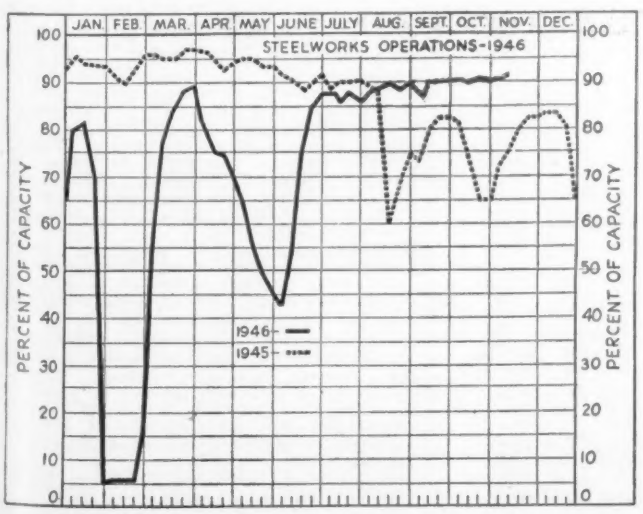
Some further changes may be made this year in government restrictions but major revisions probably will await convening of new Congress

SHIFT in congressional control in January as a result of the elections is interpreted by many officials in the metalworking industry as hastening the end of wartime economic regulations.

Various changes may come before the end of 1946 in view of the possible consolidation of agencies and imposition of restrictions on their powers. However, in the absence of any definite statement of policy by the administration steel producers are inclined to discount the possibility of sweeping changes in metals controls until at least the convening of the new Congress.

Meanwhile, steel demand is being dominated by two conflicting forces: Disposition to mark time on the one hand, pending better balance of consumer inventories; a disposition on the other hand to lay in as much steel as possible because of the beclouded labor outlook in both the coal and steel industries. Still higher wage demands and possibly work stoppages of a devastating character are in prospect.

On the basis that priorities will continue in effect after the turn of the year, a Nov. 8 deadline for the filing of first quarter priority assistance by those engaged in essential housing work was established by the Civilian Production Administration. Producers already are receiving some rated orders for that period. As heretofore, the emphasis continues on sheets, especially galvanized sheets. Some producers, who have not even opened their books for first quarter, are covered on galvanized sheets on the basis of anticipated arrearages at the end of this year. On uncoated sheets, arrearages probably will average eight to ten weeks' production. Certain sheet producers, not yet knowing what to count on in the way of new rated work, have not set up quotas for the first quarter, although the lead time for January is virtually at hand.



DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week Ended Nov. 9	Change	Same Week 1945	Same Week 1944
Pittsburgh	98.5	None	75	91.5
Chicago	92	— 0.5	82	100.5
Eastern Pa.	77	— 1	74	95.5
Youngstown	91	None	55	88
Wheeling	89	+ 7.5	85	91
Cleveland	93	+ 4	81	93
Buffalo	88.5	None	86	90.5
Birmingham	99	None	95	90
New England	88	— 2	82	88
Cincinnati	93	+ 5	77	87
St. Louis	68	+ 2.5	68	75
Detroit	86	— 5	87	87
Estimated national rate	91.5	+ 0.5	76	96.5

Based on weekly steelmaking capacity of 1,762,381 net tons for 1946; 1,831,636 tons for 1945; 1,791,287 tons for 1944.

Some hot-finished carbon bar sellers are booked up for the first quarter with quotas confined to their regular customers. To distribute small carbon bars, which are in particularly strong demand, as equitably as possible most producers have limited the amount of such tonnage to a small portion of the quotas. For instance, one large mill has restricted small size bars to 20 per cent of the full allotment.

In some instances, where consumers have been hard hit by the termination of war work and are not operating at as high a rate as prior to the war, such as shipyards, bar quotas may prove more than ample, with the possibility that some of this tonnage can later be diverted. However, such instances are expected to be relatively few. Cold-drawn carbon bars are still being accepted for first quarter in some districts, although capacity is filling up rapidly, especially in the small range of sizes. Alloy bar capacity continues ample, with shipments still available in some directions for delivery before the end of the year.

Estimated steelworks operations last week gained ½-point to 91.5 per cent of capacity, a new postwar high. Steelmaking advanced 5 points to 93 per cent in the Cincinnati district, the highest since the war's end, while it rose 4 points further to 93 per cent in the Cleveland district, the highest since April. Advances of 7½ points to 89 per cent at Wheeling and of 2½ points to 68 per cent in St. Louis were also recorded. Detroit lost 5 points to 86 per cent and New England, 2½ points to 88 per cent. Operations were off ½ point at Chicago at 92 per cent while they dropped 1 point in eastern Pennsylvania to 77 per cent. The operating rates in all other districts held unchanged at high levels.

Average composite prices for steel and iron products held unchanged last week as follows: Finished steel, $64.45; semifinished steel, $40.60; steelmaking pig iron, $27.50; and steelmaking scrap, $19.17.

COMPOSITE MARKET AVERAGES

	Nov. 9	Nov. 2	Oct. 26	One Month Ago Oct., 1946	Three Months Ago Aug., 1946	One Year Ago Nov., 1945	Five Years Ago Nov., 1941
Finished Steel	$64.45	$64.45	$64.45	$64.45	$64.45	$58.27	$56.73
Semifinished Steel	40.60	40.60	40.60	40.60	40.60	37.80	36.00
Steelmaking Pig Iron	27.50	27.50	27.50	27.50	27.50	24.75	23.00
Steelmaking Scrap	19.17	19.17	19.17	19.17	19.17	19.17	19.17

Finished Steel Composite:—Average of industry-wide prices on sheets, strips, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania. Finished steel, net tons; others, gross tons.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished material (except tin plate) and wire rods, cents per lb; coke, dollars per net ton; others, dollars per gross ton.

Finished Material

	Nov. 9, 1946	Oct., 1946	Aug., 1946	Nov., 1945
Steel bars, Pittsburgh	2.50c	2.50c	2.50c	2.25c
Steel bars, Philadelphia	2.86	2.86	2.86	2.57
Steel bars, Chicago	2.50	2.50	2.50	2.25
Shapes, Pittsburgh	2.35	2.35	2.35	2.10
Shapes, Philadelphia	2.48	2.48	2.48	2.215
Shapes, Chicago	2.35	2.35	2.35	2.10
Plates, Pittsburgh	2.50	2.50	2.50	2.25
Plates, Philadelphia	2.558	2.558	2.558	2.30
Plates, Chicago	2.50	2.50	2.50	2.25
Sheets, hot rolled, Pittsburgh	2.425	2.425	2.425	2.20
Sheets, cold-rolled, Pittsburgh	3.275	3.275	3.275	3.05
Sheets, No. 24 galv., Pittsburgh	4.05	4.05	4.05	3.70
Sheets, hot-rolled, Gary	2.425	2.425	2.425	2.20
Sheets, cold-rolled, Gary	3.275	3.275	3.275	3.05
Sheets, No. 24 galv., Gary	4.05	4.05	4.05	3.70
Hot-rolled strip, over 6 to 12-in., Pitts.	2.35	2.35	2.35	2.10
Cold-rolled strip, Pittsburgh	3.05	3.05	3.05	2.80
Bright basic, bess. wire, Pittsburgh	3.05	3.05	3.05	2.75
Wire nails, Pittsburgh	3.75	3.75	3.75	2.90
Tin plate, per base box, Pittsburgh	$5.25	$5.25	$5.25	$5.00

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$38.00	$38.00	$38.00	$36.00
Slabs, Pittsburgh, Chicago	39.00	39.00	39.00	36.00
Rerolling billets, Pittsburgh	39.00	39.00	39.00	36.00
Wire rods, No. 5 to $\frac{9}{32}$-inch, Pitts.	2.30c	2.30c	2.30c	2.15c

Pig Iron

	Nov. 9, 1946	Oct., 1946	Aug., 1946	Nov. 1945
Bessemer del. Pittsburgh	$29.77	$29.77	$29.77	$26.94
Basic, Valley	28.00	28.00	28.00	25.25
Basic, eastern del. Philadelphia	29.93	29.93	29.93	27.09
No. 2 fdry., del. Pgh. N. & S. sides	29.27	29.27	29.27	26.44
No. 2 fdry., del. Philadelphia	30.43	30.43	30.43	27.59
No. 2 foundry, Chicago	28.50	28.50	28.50	25.75
Southern No. 2, Birmingham	24.88	24.88	24.88	22.13
Southern No. 2, del. Cincinnati	28.94	28.94	28.94	26.05
Malleable, Valley	28.50	28.50	28.50	25.75
Malleable, Chicago	28.50	28.50	28.50	25.75
Charcoal, low phos., fob Lyles, Tenn.	33.00	33.00	33.00	33.00
Gray forge, del. McKees Rocks, Pa.	28.61	28.61	28.61	25.80
Ferromanganese, fob cars, Pittsburgh	140.00	140.00	140.00	140.00

Scrap

Heavy melting steel, No. 1, Pittsburgh	$20.00	$20.00	$20.00	$20.00
Heavy melt. steel, No. 2, E. Pa.	18.75	18.75	18.75	18.75
Heavy melting steel, Chicago	18.75	18.75	18.75	18.75
Rails for rolling, Chicago	22.25	22.25	22.25	22.25
No. 1 cast, Chicago	25.00	25.00	20.00	20.00

Coke

Connellsville, furnace ovens	$8.75	$8.75	$8.75	$7.50
Connellsville, foundry ovens	9.50	9.50	9.50	8.25
Chicago, by-product fdry., del.	15.10	15.10	15.10	13.75

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Finished steel quoted in cents per pound and semifinished in dollars per gross ton, except as otherwise noted. Delivered prices do not include the 3 per cent federal tax on freight. Pricing on rails was changed to net ton basis as of Feb. 15, 1946.

Semifinished Steel

Carbon Steel Ingots: Rerolling quality, standard analysis, $33, fob mill; forging quality, $38, Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown.

Alloy Steel Ingots: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, Coatesville, uncrop, $48.69.

Rerolling, Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $39; Detroit, del., $41.50; Duluth (billets), $41; Pac. ports (billets), $51.50 (Andrews Steel Co., carbon slabs, $41; Northwestern Steel & Wire Co., $41, Sterling, Ill.; Granite City Steel Co., $47.50 gross ton slabs from D.P.C. mill. Geneva Steel Co., $58.64, Pac. ports.)

Forging Quality Blooms, Slabs, Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $47; Detroit, del., $49.50; Duluth, billets, $49; forging billets fob Pac. ports, $59.50.

(Andrews Steel Co. may quote carbon forging billets $50 gross ton at established basing points; Follansbee Steel Corp., $49.50 fob Toronto, O.; Geneva Steel Co., $64.64, Pacific ports.)

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $58.43; del. Detroit $60.93; eastern Mich. $61.93.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $38. (Empire Sheet & Tin Plate Co., Mansfield, O., carbon, sheet bars, $39, fob mill.)

Skelp: Pittsburgh, Chicago, Sparrows Point, Youngstown, Coatesville, lb, 2.05c.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, No. 5—$\frac{9}{32}$ in. inclusive, per 100 lb, $2.30. Do., over $\frac{9}{32}$—$\frac{47}{64}$-in., incl., $2.45; Galveston, base, $2.40 and $2.55, respectively. Worcester add $0.10; Pacific ports $0.535.

Bars

Hot-Rolled Carbon Bars and Bar-Size Shapes under 3-in.: Pittsburgh, Youngstown, Chicago, Gary, Cleveland, Buffalo, Birmingham base, 20 tons one size, 2.50c; Duluth, base, 2.60c; Detroit, del., 2.635c; eastern Mich., 2.685c; New York, del., 2.86c; Phila., del., 2.86c; Gulf ports, dock, 2.885c; Pac. ports, dock, 3.185c (Joslyn Mfg. & Supply Co. may quote 2.55c, fob Chicago.)

Rail Steel Bars: Same prices as for hot-rolled carbon bars except base is 5 tons.

Hot-Rolled Alloy Bars: Pittsburgh, Youngstown, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 2.921c; Detroit, del., 3.056c. (Texas Steel Co. may use Chicago base price as maximum fob Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

AISI Series	(*Basic O-H)	AISI Series	(*Basic O-H)
1300	$0.108	4300	$1.839
2300	1.839	4600	1.298
2500	2.759	4800	2.326
3000	0.541	5100	0.379
3100	0.920	5130 or 5152	0.494
3200	1.461	6120 or 6152	1.028
3400	3.462	6145 or 6150	1.298
4000	0.487	8612	0.703
4100 (.15-.25 Mo)	0.757	8720	0.757
(.20-.30 Mo)	0.812	9830	1.407

* Add 0.25 for acid open-hearth; 0.50 electric.

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base, 20,000-39,999 lb, 3.10c; Detroit, 3.15c; Toledo, 3.25c.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base, 3.625c; Detroit, del., 3.76c; eastern Mich., 3.79c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base, 2.35c; Detroit, del., 2.485c; eastern Mich. and Toledo, 2.535c; Gulf ports, dock, 2.735c; Pacific ports, dock 2.785c.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo, base, 2.35c; Detroit, del., 2.485c; eastern Mich. and Toledo, del., 2.535c; Gulf ports, dock, 2.735c.

Iron Bars: Single refined, Pitts., 4.76c; double refined, 5.84c; Pittsburgh, staybolt, 6.22c; Terre Haute, single ref., 5.42c; double ref., 6.76c.

Sheets, Strip

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base, 2.425c; Granite City, base, 2.525c; Detroit, del., 2.56c; eastern Mich., del., 2.61c; Phila., del., 2.615c; New York, del., 2.685c; Pacific ports, 3.01c. (Andrews Steel Co. may quote hot-rolled sheets for shipment to the Detroit area on the Middletown, O., base; Alan Wood Steel Co., Conshohocken, Pa., may quote 3.00c on hot carbon sheets, Sparrows Point, Md.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.275c; Granite City, base, 3.375c; Detroit, del., 3.41c; eastern Mich., del., 3.46c; New York, del., 3.615c; Phila., del., 3.635c; Pacific ports, 3.96c.

Galvanized Sheets, No. 24: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base, 4.05c; Granite City, base, 4.15c; New York, del., 4.31c; Phila., del., 4.24c; Pacific ports, 4.635c.

Corrugated Galv. Sheets: Pittsburgh, Chicago, Gary, Birmingham, 29-gage, per square, 3.73c.

Culvert Sheets: Pittsburgh, Chicago, Gary, Birmingham, 16-gage not corrugated, copper alloy, 4.15c; Granite City, 4.25c; Pacific ports, 4.635c; copper iron, 4.50c; pure iron, 4.50c; zinc-coated, hot-dipped, heat-treated, No. 24, Pittsburgh, 4.60c.

Aluminized Sheets, 20 gage: Pittsburgh, hot-dipped, coils or cut to lengths 9.00c.

Enameling Sheets: 10-gage; Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base 3.20c; Granite City, base 3.30c; Detroit, del., 3 335c; eastern Mich., 3.385c; Pacific ports, 3.885c; 20-gage: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base, 3.80c; Detroit, del., 3.935c; eastern Mich., 3.985c; Pacific ports, 4.485c.

Electrical Sheets No. 24:

	Pittsburgh Base	Pacific Ports	Granite City
Field grade	3.90c	4.685c	4.00c
Armature	4.25c	5.035c	4.35c
Electrical	4.75c	5.535c	4.85c
Motor	5.425c	6.21c	5.525c
Dynamo	6.125c	6.91c	6.225c
Transformer			
72	6.625c	7.41c	....
65	7.625c	8.41c	....
58	8.125c	8.91c	....
52	8.925c	9.71c	....

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, 6-in. and narrower: Base, 2.45c; Detroit, del., 2.585c; eastern Mich., del., 2.635c; Pacific ports, 3 135c. (Superior Steel Corp. may quote 3.30c, Pitts.)
Over 6-in.: Base, 2.35c; Detroit, del., 2.485c; eastern Mich., del., 2.535c; Pacific ports, 3.035c. (Superior Steel Corp. may quote 3.20c, Pitts.)

Cold-Rolled Strip: Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less, 3.05c; Chicago, base, 3.15c; Detroit, del., 3.185c; eastern Mich., del., 3.235c; Worcester, base, 3.25c. (Superior Steel Corp. may quote 4.70c, Pitts.)

Cold-Finished Spring Steel: Pittsburgh, Cleveland base, 0.26-0.50 carbon, 3.03c. Add 0.20c for Worcester.

Tin, Terne Plate

(OPA ceiling prices announced March 1, 1946.)
Tin Plate: Pittsburgh, Chicago, Gary, 100-lb base box, $5.25; Granite City, Birmingham, Sparrows Point, $5.35.
Electrolytic Tin Plate: Pittsburgh, Gary, 100-lb base box 0.25 lb tin, $4.60; 0.50 lb tin, $4.75; 0.75 lb tin, $4.90; Granite City, Birmingham, Sparrows Point, $4.70, $4.85, $5.00, respectively.
Tin Mill Black Plate: Pittsburgh, Chicago, Gary, base 29-gage and lighter, 3.30c; Granite City, Birmingham, Sparrows Point, 3.40c; Pacific ports, boxed 4.335c.
Long Ternes: Pittsburgh, Chicago, Gary, No. 24 unassorted, 4.05c; Pacific ports, 4.835c.
Manufacturing Ternes (Special Coated): Pittsburgh, Chicago, Gary, 100-base box, $4.55; Granite City, Birmingham, Sparrows Point, $4.65.
Roofing Ternes: Pittsburgh base per package 112 sheets; 20 x 28 in., coating I. C. 8-lb $12.50; 15-lb $14.50; 20-lb $15.50 (nom.); 40-lb $20.00 (nom.).

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.50c; Geneva, Utah, 2.65c; New York, del., 2.71c; Phila., del., 2 558c; St. Louis, del., 2.74c; Boston, del., 2.86c; Pacific ports, 3.085c; Gulf ports, 2.885c.
(Granite City Steel Co. may quote carbon plates 2.65c fob DPC mill; Central Iron & Steel Co., Harrisburg, Pa., 2.80c, basing points; Lukens Steel Co., Coatesville, Pa., 2.75c, base; Worth Steel Co., Claymont, Del., 2.60c, base; Alan Wood Steel Co., Conshohocken, Pa., 2.75c base.)

Floor Plates: Pittsburgh, Chicago, 3.75c; Pacific ports, 4.435c; Gulf ports, 4.135c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, Coatesville, 3.787c; Gulf ports, 4.308c; Pacific ports, 4.525c.

Clad Steel Plates: Coatesville, 10% cladding: nickel-clad, 18.72c; inconel-clad, 26.00c; monel-clad, 24.96c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.35c; New York, del., 2.54c; Phila., del., 2.48c; Pacific ports, 3.035c; Gulf ports, 2.735c.
(Phoenix Iron Co., Phoenixville, Pa., may quote the equivalent of 2.60c. Bethlehem, Pa., on the general range and 2.70c on beams and channels from 4 to 10 inches.)
Steel Piling: Pittsburgh, Chicago, Buffalo, 2.65c; Pacific ports, 3.235c.

Wire and Wire Products

(Fob Pittsburgh, Chicago, Cleveland and Birmingham per 100 pounds).
Wire to Manufacturers in carloads

Bright, basic or bessemer	*$3.05
Spring (except Birmingham)	*$4.00
Wire Products to Trade	
Nails and Staples	
Standard and cement-coated	†$3.75
Galvanized	†$3.40
Wire, Merchant Quality	
Annealed	§$3.50
Galvanized	§$.385

(Fob Pittsburgh, Chicago, Cleveland, Birmingham, per base column)

Woven fence, 15½ gage and heavier	72
Barbed wire, 80-rod spool	**79
Barbless wire, twisted	**79
Fence posts	74
Bale ties, single loop	72½

*Add $0.10 for Worcester, $0.05 for Duluth and $0.535 for Pacific ports.
†Add $0.30 for Worcester, $0.535 for Pacific ports. Nichols Wire & Steel may quote $4.25; Pittsburgh Steel Co., $4.10.
‡Add $0.535 for Pacific ports.
§Add $0.10 for Worcester; $0.735 Pacific ports.
**Pittsburgh Steel Co. may quote 89.

Tubular Goods

Welded Pipe: Base price in carloads, threaded and coupled to consumers about $200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain O.; Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

Butt Welded

	Steel			Iron	
In.	Blk.	Galv.	In.	Blk.	Galv.
⅛	53	30	½	21	01½
¼ & ⅜	56	37½	¾	27	7
½	60½	48	1-1¼	31	13
¾	63½	52	1½	35	15½
1-3	65½	54½	2	34½	15

Lap Weld

	Steel			Iron	
In.	Blk.	Galv.	In.	Blk.	Galv.
2	58	46½	1¼	20	0½
2½-3	61	49½	1½	25½	7
3½-6	63	51½	2	27½	9
7-8	62	49½	2½-3½	28½	11½
9-10	61½	49	4	30½	15
11-12	60½	48	4½-8	29½	14
			9-12	25½	9

Boiler Tubes: Net base prices per 100 feet fob Pittsburgh in carload lots, minimum wall, cut length 4 to 24 feet, inclusive.

		—Seamless—		—Elec. Weld—	
O.D. sizes	B.W.G.	Hot Rolled	Cold Drawn	Hot Rolled	Cold Rolled
1″	13	.....	$9.90	$9.36	$9.65
1¼″	13	.....	11.73	9.63	11.43
1½″	13	$10.91	12.96	10.63	12.64
1¾″	13	12.41	14.75	12.10	14.37
2″	13	13.90	16.52	13.53	16.19
2¼″	13	15.50	18.42	15.06	18.03
2¼″	12	17.07	20.28	16.57	19.83
2½″	12	18.70	22.21	18.11	21.68
2¾″	12	19.82	23.54	19.17	22.95
3″	12	20.79	24.71	20.05	24.02
3½″	11	26.24	31.18	25.30	30.29
4″	10	32.56	38.68	31.32	37.52
4½″	9	43.16	51.29	.....	.....
5″	9	49.96	59.36	.....	.....
6″	7	76.71	91.14	.....	.....

Pipe, Cast Iron: Class B, 6-in. and over, $60 per net ton, Birmingham; $65, Burlington, N. J.; $62.80, del., Chicago; 4-in. pipe, $5 higher, Class A pipe, $3 a ton over class B.

Rails, Supplies

Standard rails, over 60-lb, fob mill, net ton, $43.40. Light rails (billet), Pittsburgh, Chicago, Birmingham, net ton, $49.18.
Relaying rails, 35 lb and over, fob railroad and basing points, $31-$33.
Supplies: Track bolts, 6.50c; heat treated, 6.75c. Tie plates $51 net ton, base, Standard spikes, 3.65c

Bolts, Nuts

Fob Pittsburgh, Cleveland, Birmingham, Chicago. Additional discounts: 5 for carloads; 10 for full containers, except tire, step and plow bolts.
(Ceiling prices advanced 12 per cent, effective July 27, 1946; discounts remain unchanged.)

Carriage and Machine

½ x 6 and smaller	65½ off
Do., ⅞ and ⅝ x 6-in. and shorter	63½ off
Do., ¾ to 1 x 6-in. and shorter	61 off
1⅛ and larger, all lengths	59 off
All diameters, over 6-in. long	59 off
Tire bolts	50 off
Step bolts	56 off
Plow bolts	65 off

Stove Bolts

In packages, nuts separate, 71-10 off, nuts attached, 71 off; bulk, 80 off on 15,000 of 3-in. and shorter, or 5000 over 3 in., nuts separate.

Nuts

Semifinished hex	U.S.S.	S.A.E.
⅞-in. and smaller	..	64
½-in. and smaller	62	..
½-in.-1-in.	..	60
⅝-in.-1-in.	59	..
1⅛-in.-1½-in.	57	58
1⅝-in. and larger	56	..

Additional discount of 10 for full kegs.

Hexagon Cap Screws

Upset 1-in., smaller	64 off
Milled 1-in., smaller	60 off

Square Head Set Screws

Upset 1-in. and smaller	71 off
Headless, ¼-in. and larger	60 off
No. 10 and smaller	70 off

Rivets

Fob Pittsburgh, Cleveland, Chicago, Birmingham

Structural	4.75c
⅞-inch and under	*65-5 off

*Plus 12 per cent increase on base prices effective July 26.

Washers, Wrought

Fob Pittsburgh, Chicago, Philadelphia, to jobbers and large nut and bolt manufacturers, lcl ..... $2.75-$3.00 off

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, Canton, O., Dunkirk, N. Y., base, cents per lb; reg. carbon 15.15c; extra carbon 19.48c; special carbon 23.80c; oil-hardening 25.97c; high carbon-chromium 46.53c.

W	Cr	V	Mo	Base per lb
18.00	4	1	...	72.49c
1.5	4	1	8.5	58.43c
...	4	2	3	58.43c
6.40	4.15	1.90	5	62.22c
5.50	4.50	4	4.50	75.74c

Stainless Steels

Base, Cents per lb

CHROMIUM NICKEL STEELS

	Bars	Plates	Sheets	H.R. Strip	C.R. Strip
302	25.96c	29.21c	36.79c	23.93c	30.30c
303	28.13	31.38	38.95	29.21	35.71
304	27.05	31.38	38.95	25.45	32.46
308	31.38	36.79	44.36	30.84	37.87
309	38.95	43.28	50.85	40.03	50.85
310	53.02	56.26	57.35	52.74	60.50
312	38.95	43.28	53.02	....	....
*316	43.28	47.61	51.94	43.28	51.94
§321	31.38	36.79	44.36	31.65	41.12
†347	35.71	41.12	48.69	35.71	45.44
431	20.56	23.80	31.38	18.94	24.35

STRAIGHT CHROMIUM STEEL

403	23.93	26.51	31.92	22.99	29.23
**410	20.02	23.93	28.67	18.39	23.80
416	20.56	23.80	29.21	19.75	25.45
††420	25.96	30.84	36.25	25.70	39.49
430	20.56	23.80	31.38	18.94	24.35
‡‡430F	21.10	24.35	31.92	20.29	26.51
440A	25.96	30.84	36.25	25.70	39.49
442	24.35	27.59	35.17	25.96	34.62
443	24.35	27.59	35.17	25.96	34.62
446	29.76	33.00	39.19	37.87	56.26
501	8.66	12.98	17.04	12.98	18.39
502	9.74	14.07	18.12	14.07	19.48

STAINLESS CLAD STEEL (20%)
(Fob Pittsburgh and Washington, Pa., plate prices include annealing and pickling.)

304	....	19.48	20.56	....
410	....	17.31	18.39	....
430	....	17.85	18.94	....
446	....	19.48	20.56	....

* With 2-3% molybdenum. § With titanium † With columbium. ** Plus machining agent †† High carbon. ‡‡ Free machining.

Metallurgical Coke

Price Per Net Ton

Beehive Ovens

Connellsville, furnace	*$8.75
Connellsville, foundry	9.25- 9.75
New River, foundry	10.25-10.50
Wise county, foundry	9.00- 9.50
Wise county, furnace	8.50- 9.00
By-Product Foundry	
Kearney, N. J., ovens	14.40
Chicago, outside delivered	14.35
Chicago, delivered	15.10
Terre Haute, delivered	14.85
Milwaukee, ovens	15.10
New England, delivered	16.00
St. Louis, delivered	†15.10
Birmingham, delivered	12.25
Indianapolis, delivered	14.85
Cincinnati, delivered	14.60
Cleveland, delivered	14.55
Buffalo, delivered	14.75
Detroit, delivered	15.10
Philadelphia, delivered	14.65

* Operators of hand-drawn ovens using trucked coal may charge $9.35; retroactive to May 17, 1946, on adjustable pricing.
† 15.68 from other than Ala., Mo., Tenn.

Coke By-Products

Spot, gal, freight allowed east of Omaha	
Pure and 90% benzol	15.00c
Toluol, two degree	22.00c
Industrial xylol	22.00c
Per pound fob works	
Phenol (car lots, returnable drums)	11.25c
Do., less than carlots	12.00c
Do., tank cars	10.25c
Eastern plants, per pound	
Naphthalene flakes, balls, bbl, to jobbers, "household use"	9.00c
Per ton, bulk, fob plants	
Sulphate of ammonia	$30.00

WAREHOUSE STEEL PRICES

Base delivered prices, cents per pound, for delivery within switching limits, subject to established extras. Quotations based on mill prices announced March 1, 1946

	Hot-rolled bars	Structural shapes	Plates	Floor plates	Hot-rolled sheets (10-gage base)	Hot-rolled strip (14-gage and lighter, 6-in. and narrower)	Hot-rolled strip (12-gage and heavier wider than 6-inch)	Galvanized flat sheets (24-gage base)	Cold-rolled sheets (17-gage base)	Cold finished bars	Cold-rolled strip
Boston	4.356[1]	4.203[1]	4.203[1]	6.039[1]	4.050[1]	5.548[1]	4.418[1]	5.725[12]	5.031[14]	4.656[21]	4.965
New York	4.134[1]	4.038[1]	4.049[1]	5.875[1]	3.856[1]	4.375[1]	4.275[1]	5.501[12]	4.838[14]	4.584[21]	5.075
Jersey City	4.155[1]	4.018[1]	4.049[1]	5.875[1]	3.856[1]	4.375[1]	4.275[1]	5.501[12]	4.890[14]	4.605[21]	5.075
Philadelphia	4.114[1]	3.937[1]	3.875[1]	5.564[1]	3.774[1]	4.664[1]	4.554[1]	5.499[15]	5.139[25]	4.564[21]	5.064
Baltimore	4.093[1]	4.05[1]	3.865[1]	5.543[1]	3.64[1]	4.293[1]	4.193[1]	5.365[17]	5.118[20]	4.543[21]	....
Washington	4.232[1]	4.22[1]	4.067[1]	5.632[1]	3.842[1]	4.432[1]	4.332[1]	5.667[17]	5.007[24]	4.532[21]	....
Norfolk, Va.	4.377[1]	4.303[1]	4.262[1]	5.777[1]	4.037[1]	4.927[1]	4.477[1]	5.862[17]	4.552[24]	4.677[21]	....
Bethlehem, Pa.*	....	3.70[1]	....	....	....	....	....	....	....	....	....
Claymont, Del.*	....	....	3.70[1]	....	....	....	....	....	....	....	....
Coatesville, Pa.*	....	....	3.70[1]	....	....	....	....	....	....	....	....
Buffalo (city)	3.60[1]	3.65[1]	3.92[1]	5.55[1]	3.575[1]	4.21[1]	4.11[1]	5.20[15]	4.625[16]	4.20[21]	4.96
Buffalo (country)	3.50[1]	3.55[1]	3.55[1]	5.15[1]	3.475[1]	3.85[1]	3.750[1]	5.10[15]	4.525[16]	4.10[21]	4.60
Pittsburgh (city)	3.60[1]	3.65[1]	3.65[1]	5.25[1]	3.575[1]	3.95[1]	3.850[1]	5.327[13]	4.625[24]	4.20[21]	4.70
Pittsburgh (country)	3.50[1]	3.55[1]	3.55[1]	5.15[1]	3.475[1]	3.85[1]	3.750[1]	5.10[13]	4.525[24]	4.10[21]	4.60
Cleveland (city)	3.60[1]	3.88[1]	3.65[1]	5.48[1]	3.575[1]	3.95[1]	3.850[1]	5.347[12]	4.625[24]	4.20[21]	4.70
Cleveland (country)	3.50[1]	....	3.55[1]	....	3.475[1]	3.85[1]	3.750[1]	....	4.525[24]	4.10[21]	4.00
Detroit	3.735[1]	3.987[1]	3.935[1]	5.607[1]	3.710[1]	4.085[1]	3.985[1]	5.526[15]	4.760[24]	4.25[12]	4.985
Omaha (city, del.)	4.32[1]	4.37[1]	4.37[1]	5.97[1]	4.045[1]	4.52[1]	4.42[1]	6.00[15]	5.72[24]	4.945[21]	....
Omaha (country)	4.22[1]	4.27[1]	4.27[1]	5.87[1]	3.945[1]	4.42[1]	4.32[1]	5.90[15]	....	....	....
Cincinnati	3.902[1]	3.983[1]	3.952[1]	5.583[1]	3.671[1]	4.046[1]	3.946[1]	5.296[15]	4.271[24]	4.602[21]	....
Youngstown*	....	....	....	....	....	....	....	4.85[12]	....	....	....
Middletown, O.*	....	....	....	....	3.475[1]	3.85[1]	3.750[1]	5.10[16]	....	....	....
Chicago (city)	3.75[1]	3.80[1]	3.80[1]	5.40[1]	3.475[1]	3.95[1]	3.850[1]	†5.40[15]	4.425[24]	4.20[21]	4.90
Milwaukee	3.908[1]	3.958[1]	3.958[1]	5.558[1]	3.633[1]	4.108[1]	4.008[1]	†5.558[15]	4.583[24]	4.358[21]	5.058
Indianapolis	3.83[1]	3.88[1]	3.88[1]	5.48[1]	3.743[1]	4.118[1]	4.018[1]	5.368[15]	4.793[24]	4.43[21]	5.060
St. Paul	4.092[2]	4.142[2]	4.142[2]	5.742[2]	3.817[2]	4.292[2]	4.192[2]	5.666[15]	4.767[24]	4.852[21]	5.398
St. Louis	3.918[1]	3.968[1]	3.968[1]	5.568[1]	3.643[1]	4.118[1]	4.018[1]	5.622[15]	4.593[24]	4.522[21]	5.222
Memphis, Tenn.	4.296[1]	4.346[1]	4.346[1]	6.071[1]	4.221[1]	4.596[1]	4.496[5]	5.746[15]	....	4.821[21]	....
Birmingham	3.75[1]	3.80[1]	3.80[1]	6.153[1]	3.675[1]	4.05[1]	4.05[1]	5.20[15]	5.077[24]	4.99[21]	5.465
New Orleans (city)	4.358[1]	4.408[1]	4.408[1]	6.329[1]	4.283[1]	4.658[1]	....	5.808[15]	5.304[24]	5.079[21]	....
Houston, Tex.	4.00[2]	4.50[1]	4.50[1]	5.75[2]	3.988[2]	4.668[2]	4.563[6]	5.763[24]	5.819[16]	4.10[21]	....
Los Angeles	4.65[4]	4.70[4]	5.80[4]	7.05[4]	4.95[4]	5.30[4]	5.200[4]	6.55[13]	6.60[6]	6.105[21]	5.868
San Francisco	4.235[7]	4.185[7]	4.185[7]	5.885[7]	4.16[7]	5.885[1]	4.535[1]	6.385[15]	6.91[15]	5.783[21]	7.588
Portland, Oreg.	4.70[27]	4.70[27]	5.00[27]	6.75[27]	4.875[27]	6.65[27]	5.000[27]	6.20[15]	6.825[15]	5.983[15]	....
Tacoma, Wash.	4.60[6]	4.70[6]	5.00[6]	6.75[6]	4.87[6]	5.80[6]	4.60[6]	6.40[15]	6.55[15]	6.23[21]	....
Seattle	4.60[6]	4.70[6]	5.00[6]	6.75[6]	4.87[6]	5.80[6]	4.60[6]	6.40[15]	6.55[15]	6.23[21]	....

* Basing point cities with quotations representing mill prices, plus warehouse spread; † open market price.

BASE QUANTITIES

[1]—400 to 1999 pounds; [2]—400 to 14,999 pounds; [3]—any quantity; [4]—360 to 1999 pounds; [5]—400 to 8999 pounds; [6]—300 to 9999 pounds; [7]—400 to 39,999 pounds; [8]—under 2000 pounds; [9]—under 4000 pounds; [10]—500 to 1499 pounds; [11]—one bundle to 39,999 pounds; [12]—150 to 2249 pounds; [13]—150 to 1499 pounds; [14]—three to 24 bundles; [15]—450 to 1499 pounds; [16]—one bundle to 1499 pounds; [17]—one to nine bundles; [18]—one to six bundles; [19]—100 to 749 pounds; [20]—300 to 1999 pounds; [21]—1500 to 39,999 pounds; [22]—1500 to 1999 pounds; [23]—1000 to 39,999 pounds; [24]—400 to 1499 pounds; [25]—1000 to 1999 pounds; [26]—under 25 bundles. Cold-rolled strip, 2000 to 39,999 pounds, base; [27]—300 to 4999 pounds.

ORES

Lake Superior Iron Ore

Gross ton, 51½% (Natural) Lower Lake Ports

Old range bessemer	$5.45
Mesabi nonbessemer	5.05
High phosphorus	5.05
Mesabi bessemer	5.20
Old range nonbessemer	5.30

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56-63% contract	13.00

Foreign Ore

Cents per unit, cfi Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mn.,	Nom.
N. African low phos.	Nom.
Swedish basic, 60 to 68%	13.00
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% fob Rio de Janeiro	7.50–8.00

Tungsten Ore

Chinese Wolframite, per short ton unit, duty paid	$24.00

Chrome Ore

Gross ton fob cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Oreg., or Tacoma, Wash. (S S paying for discharge; dry basis, subject to penalties if guarantees are not met.)

Indian and African

48% 2.8:1	$39.75
48% 3:1	41.00
48% no ratio	31.00

South African (Transvaal)

44% no ratio	$27.40
45% no ratio	28.30
48% no ratio	31.00
50% no ratio	32.80

Brazilian—nominal

44% 2.5:1 lump	$33.65
48% 3:1 lump	43.50

Rhodesian

45% no ratio	$28.30
48% no ratio	31.00
48% 3:1 lump	41.00

Domestic (seller's nearest rail)

48% 3:1	$43.50

less $7 freight allowance.

Manganese Ore

Sales prices of Office of Metals Reserve, cents per gross ton unit, dry, 48%, at New York, Philadelphia, Baltimore, Norfolk, Mobile and New Orleans, 85c; Fontana, Calif., Provo, Utah, and Pueblo, Colo., 91c; prices include duty on imported ore and are subject to established premiums, penalties and other provisions. Price at basing points which are also points of discharge of imported manganese ore is fob cars, shipside, at dock most favorable to the buyer. Outside shipments direct to consumers at 15c to 17c per unit less than Metal Reserve prices.

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

NATIONAL EMERGENCY STEELS (Hot Rolled)

(Extras for alloy content)

Desig-nation	Chemical Composition Limits, Per Cent — Carbon	Mn	Si	Cr	Ni	Mo	Basic open-hearth Electric furnaces: Bars per 100 lb	Billets per GT	Bars per 100 lb	Billets per GT
NE 9415	.13-.18	.80-1.10	.20-.35	.30-.50	.30-.60	.08-.15	$0.812	$16.230	$1.353	$27.050
NE 9425	.23-.28	.80-1.20	.20-.35	.30-.50	.30-.60	.08-.15	.812	16.230	1.353	27.050
NE 9442	.40-.45	1.00-1.30	.20-.35	.30-.50	.30-.60	.08-.15	.866	17.312	1.407	28.132
NE 9722	.20-.25	.50-.80	.20-.35	.10-.25	.40-.70	.15-.25	.703	14.066	1.244	24.886
NE 9912	.10-.15	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.298	25.968	1.677	33.542
NE 9920	.18-.23	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.298	25.968	1.677	33.542

Extras are in addition to a base price of 2.921c per pound on finished products and $58.43 per gross ton on semifinished steel major basing points and are in cents per pound and dollars per gross ton. No prices quoted on vanadium alloy.

PIG IRON

Maximum prices per gross ton fixed by OPA schedule No. 10, last amended July 27, 1946; $2 increase may be charged on adjustable pricing contracts made between May 29 and July 27. Delivered prices do not include 3 per cent federal tax, effective Dec. 1, 1942.

	No. 2 Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	$29.50	$29.00	$30.50	$30.00
Newark, N. J., del.	31.20	30.70	32.20	31.70
Brooklyn, N. Y., del.	32.28	....	....	32.78
Birdsboro, Pa., base	29.50	29.00	30.50	30.00
Birmingham, base	24.88	23.50	29.50	....
Baltimore, del.	30.22	....	....	....
Boston, del.	29.68	....	....	....
Chicago, del.	28.72	....	....	....
Cincinnati, del.	28.94	28.06	....	....
Cleveland, del.	28.62	27.74	....	....
Newark, N. J.	30.82	....	....	....
Philadelphia, del.	30.05	29.55	....	....
St. Louis, del.	28.62	29.54	....	....
Buffalo, base	28.50	27.50	29.50	29.00
Boston, del.	30.06	29.56	31.06	30.56
Rochester, del.	30.03	....	31.03	30.53
Syracuse, del.	30.58	....	31.58	31.08
Chicago, base	28.50	28.00	29.00	28.50
Milwaukee, del.	29.73	29.23	30.23	29.73
Muskegon, Mich., del.	32.05	....	....	32.05
Cleveland, base	28.50	28.00	29.00	28.50
Akron, Canton, del.	30.04	29.54	30.54	30.04
Detroit, base	28.50	28.00	29.00	28.50
Saginaw, Mich., del.	30.81	30.31	31.31	30.81
Duluth, base	29.00	28.50	29.50	29.00
St. Paul, del.	31.13	30.63	31.63	31.13
Erie, Pa., base	28.50	28.00	29.50	29.00
Everett, Mass., base	29.50	29.00	30.50	30.00
Boston, del.	30.06	29.56	31.06	30.56
Granite City, Ill., base	28.50	28.00	29.00	28.50
St. Louis, del.	29.00	28.50	....	29.00
Hamilton, O., base	28.50	28.00	....	28.50
Cincinnati, del.	29.68	29.18	....	29.68
Neville Island, Pa., base	28.50	28.00	29.00	28.50
*Pittsburgh, del., N.&S. sides	29.27	28.77	29.77	29.27
Provo, Utah, base	26.50	26.00	....	....
Sharpsville, Pa., base	28.50	28.00	29.00	28.50
Sparrows Point, base	29.50	29.00	....	....
Baltimore, del.	30.60	....	....	....
Steelton, Pa., base	....	29.00	....	....
Swedeland, Pa., base	29.50	29.00	30.50	30.00
Philadelphia, del.	30.43	29.93	....	30.93
Toledo, O., base	28.50	28.00	29.00	28.50
Youngstown, O., base	28.50	28.00	29.00	28.50
Mansfield, O., del.	30.66	30.16	31.16	30.66

* To Neville Island base add: 61c for McKees Rocks, Pa.; 93c Lawrenceville, Homestead, McKeesport, Ambridge, Monaco, Aliquippa; 97c (water), Monongahela; $1.24, Oakmont, Verona; $1.38, Brackenridge.

Exceptions to above prices: Struthers Iron & Steel Co., Struthers, O., may charge 50 cents a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable pig iron. Republic Steel Corp. may quote $2 a ton higher for foundry and basic pig iron on the Birmingham base.

High Silicon, Silvery

6.00-6.50 per cent (base).....$34.00

6.51-7.00	$35.00	9.01- 9.50	40.00
7.01-7.50	36.00	9.51-10.00	41.00
7.51-8.00	37.00	10.01-10.50	42.00
8.01-8.50	38.00	10.51-11.00	43.00
8.51-9.00	39.00	11.01-11.50	44.00

Fob Jackson county, O., per gross ton. Buffalo base $1.25 higher. Buyer may use whichever base is more favorable.

Electric Furnace Ferrosilicon: Si 14.01-14.50%, $48, Jackson, O.; $51.25 Keokuk, Iowa; $49.25 Niagra Falls, N. Y. Add $1 a ton for each additional 0.5% Si to 18%; 50c for each 0.5% Mn over 1%; $1 a ton for 0.045 % max. phos.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton.

Charcoal Pig Iron

Semi-cold blast, low phosphorus.

Fob furnace, Lyles, Tenn. $33.00 (For higher silicon irons a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Gray Forge

Neville Island, Pa. $28.00
Valley base 28.00

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Buffalo, N. Y., $34.00 base; $35.38, del., Philadelphia. Intermediate phosphorus, Central Furnace, Cleveland, $31.00.

Differentials

Basing point prices are subject to following differentials:

Silicon: An additional charge not to exceed 50 cents a ton for each 0.25 per cent silicon in excess of base grade (1.75% to 2.25%).

Phosphorus: A reduction of 38 cents a ton for phosphorus content of 0.70 per cent and over.

Manganese: An additional charge not to exceed 50 cents a ton for each 0.50 per cent, or portion thereof, manganese in excess of 1%.

Nickel: An additional charge for nickel content as follows: Under 0.50%, no extra; 0.50% to 0.74%, inclusive, $2 a ton; for each additional 0.25% nickel, $1 a ton.

Refractories

Per 1000, fob shipping point
Net prices

Fire Clay Brick

Super Duty

Pa., Mo., Ky.	$81.00

High Heat Duty

Pa., Ill., Md., Mo., Ky.	65.00
Ala., Ga.	65.00
N. J.	70.00

Intermediate Heat Duty

Ohio	57.00
Pa., Ill., Md., Mo., Ky.	59.00
Ala., Ga.	51.00
N. J.	62.00

Low Heat Duty

Pa., Md., Ohio	51.00

Malleable Bung Brick

All bases	75.00

Ladle Brick
(Pa., O., W. Va., Mo.)

Dry Press	42.00
Wire Cut	40.00

Silica Brick

Pennslyvania	65.00
Joliet, E. Chicago	74.00
Birmingham, Ala.	65.00

Magnesite

Domestic dead-burned grains, net ton, fob Chewelah, Wash

Bulk	22.00
Bags	26.00

Basic Brick

Net ton, fob Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	54.00
Chem. bonded chrome	54.00
Magnesite brick	76.00
Chem. bonded magnesite	75.00

Fluorspar

Metallurgical grade, fob shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $33; 65% to 70%, $32; 60% to 65%, $31; less than 60%, $30.

Open Market Prices of Leading Ferroalloy Products

Spiegeleisen: 19-21% carlot per gross ton, Palmerton, Pa., $36; Pittsburgh, $40.50; Chicago, $40.60.

Ferromanganese, standard: 78-82% c.l. gross ton, duty paid, $135 fob cars, Baltimore, Philadelphia or New York, whichever is most favorable to buyer, Rockdale or Rockwood, Tenn. (where Tennessee Products Co. is producer), Birmingham, Ala. (where Sloss-Sheffield Steel & Iron Co. is producer); $140 fob cars, Pittsburgh (where Carnegie-Illinois Steel Corp. is producer); add $6 for packed c.l., $10 for ton, $13.50 for less ton; $1.70 for each 1%, or fraction contained manganese over 82% or under 78%.

Ferromanganese, low carbon: Eastern zone; Special, 21c; regular, 20.50c; medium, 14.50c; central zone: special, 21.30c; regular, 20.80c; medium, 14.80c; western zone: Special, 21.55c; regular, 21.05c; medium, 15.75c. Prices are per pound contained Mn, bulk carlot shipments, fob shipping point, freight allowed. Special low-carbon has content of 90% Mn, 0.10% C, and 0.06% P.

Ferromanganese Briquets: (Weight approx. 3 lb and containing exactly 2 lb Mn) per lb of briquets. Contract, carlots, bulk 0.0605c, packed 0.063c, tons 0.0655c, less 0.068c, eastern, freight allowed; 0.063c, 0.0655c, 0.0755c and 0.078c, central; 0.066c, 0.0685c, 0.0855c and 0.088c, western; spot up 0.25c.

Ferrotungsten: Spot 10,000 lb or more, per lb contained W, $1.90; contract, $1.88; freight allowed as far west as St. Louis.

Ferrotitanium: 40-45%, R.R. freight allowed, per lb contained Ti; ton lots $1.23; less-ton lots $1.25; eastern. Spot up 5c per lb.

Ferrotitanium: 20-25%, 0.10 maximum carbon; per lb contained Ti; ton lots $1.35; less-ton lots $1.40 eastern. Spot up 5c per lb.

Ferrotitanium, High-Carbon: 15-20% contract basis, per net ton, fob Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis, 6.8% C $142.50; 3-5% C $157.50.

Ferrovanadium: V 35-55%, contract basis, per lb contained V, fob producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

Ferromolybdenum: 55-75% per lb. contained Mo, fob Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Ferrophosphorus: 17-19%, based on 18% P content with unitage of $3 for each 1% of P above or below the base; gross tons per carload fob sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrosilicon: Contract, lump, packed; eastern zone quotations: 90-95% c.l. 12.65c, ton lots 13.10c, smaller lots 13.50c; 80-90% c.l. 10.35c, ton lots 10.85c, smaller lots 11.35c; 75% c.l. 9.40c, ton lots 9.95c, smaller lots 10.45c; 50% c.l. 7.90c, ton lots 8.50c, smaller lots 9.10c. Prices are fob shipping point, freight allowed, per lb of contained Si. Spot prices 0.25c higher on 80-90%, 0.30c on 75%, 0.45c on 50%. Deduct 0.85c for bulk carlots.

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max. and C 0.50% max.) per lb of alloy contract ton lots $1.20, less ton lots $1.30, eastern, freight allowed; $1.2075 and $1.3075 central; $1.229 and $1.329, western; spot add 5c.

Ferrocolumbium: 50-60% per lb contained columbium in gross ton lots, contract basis, R. R. freight allowed, eastern zone, $2.25; less-ton lots $2.30. Spot prices up 10 cents.

Ferrochrome: Contract, lump, packed; **high carbon,** eastern zone, c.l. 15.05c, ton lots 15.55c; central zone, add 0.40c and 0.65c; western zone, add 0.5c and 1.85c; **high carbon, high nitrogen,** add 5c to all high carbon ferrochrome prices. Deduct 0.55c for bulk carlots. Spot prices up 0.25c.

Low carbon, eastern zone, bulk, c.l., max. 0.06% C 23c; 0.1% 22.50c, 0.15% 22c, 0.2% 21.50c, 0.5% 21c, 1% 20.50c, 2% 19.50c, add 1c for 2000 lb to c.l.; central zone, add 0.4c for bulk, c.l., and 0.65c for 2000 lb to c.l.; western zone, add 0.5c for bulk, c.l., and 1.85c for 2000 lb to c.l.; carload packed differential 0.45c. Prices are per pound of contained Cr, fob shipping points.

Low carbon, high nitrogen: Add 2c to low carbon ferrochrome prices. For higher nitrogen low carbon, add 2c for each 0.25% of nitrogen over 0.75%.

Ferrochrome, Special Foundry: (Cr 62-66%, C about 5-7%.) Contract, lump packed, eastern zone, freight allowed, c.l. 15.60c, ton lots 16.10c, less than ton 16.75c; central zone, add 0.40c for c.l. and 0.65c for smaller lots; western zone, add 0.5c for c.l. and 1.85c for smaller lots. Deduct 0.55c for bulk carlots.

S. M. Ferrochrome, high carbon: (Cr 60-65%, Si, Mn and C 4-6% each.): Contract, lump, packed, eastern zone, freight allowed, c.l. 16.15c, ton lots 16.65c, less ton 17.30c; central zone, add 0.40c for c.l. and 0.65c for smaller lots; western zone, add 0.5c for c.l. and 1.05c for smaller lots. Prices are per lb of contained chromium; spot prices 0.25c higher. Deduct 0.55c for bulk carlots.

S. M. Ferrochrome, low carbon: (Cr 62-66%, Si 4-6%, Mn 4-6% and C 1.25% max.) Contract, carlot, bulk, 20.00c, packed 20.15c ton lots 21.00c, less ton lots 22.00c eastern, freight allowed, per pound contained chromium, 20.40c, 20.50c, 20.95c and 22.65c, central; 21.00c, 21.45c, 22.85c and 23.85c, western; spot up 0.25c.

Ferrochrome Briquets: Containing exactly 2 lb Cr, packed eastern zone, c.l. 9.50c, ton lots 9.50c less than ton 10.10c, central zone, add 0.3c for c.l. and 0.5c for smaller lots; western zone, add 0.70c for c.l. and 2c for smaller lots. Deduct 0.30c for bulk carlots. Prices per lb of briquets; spot prices 0.25c higher.

Chromium Metal: 97% min chromium, max. 0.50% carbon, eastern zone, per lb contained chromium bulk, c.l., 79.50c, 2000 lb to c.l. 80c, central 81c and 82.60c; western 82.25c and 84.75c fob shipping point, freight allowed.

Chromium-Copper: (Cr 8-11%, Cu 88-90%, Fe 1% max., Si 0.50% max.) contract, any quantity, 45c, eastern, Niagara Falls, N. Y., basis, freight allowed to destination, except to points taking rate in excess of St. Louis rate to which equivalent of St. Louis rate will be allowed; spot up 2c.

Calcium metal; cast: Contract ton lots or more $1.35, less, $1.60, pound of metal; $1.36 and $1.61

central, $1.40 and $1.65, western; spot up 5c.

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%), per lb. of alloy. Contract, carlots, 15.50c, ton lots 16.50c and less 17.00c, eastern, freight allowed; 16.00c, 17.35c, and 17.85c, central; 18.06c, 19.10c and 19.60c western; spot up 0.25c.

Calcium - Silicon: (Ca 30-35%, Si 60-65% and Fe 3.00% max.), per lb of alloy. Contract, carlot, lump 13.00c, ton lots 14.50c, less 15.50c eastern, freight allowed; 13.50c, 15.25c and 16.25c central; 15.55c, 17.40c and 18.40c, western; spot up 0.25c.

Silicon Metal: Min. 97% Si and max. 1% Fe, eastern zone, bulk, c.l., 12.90c; 2000 lb to c.l., 13.45c; central, 13.20c and 13.90c; western, 13.85c and 16.80c; min. 96% Si and max. 2% Fe, eastern, bulk; c.l., 12.50c, 2000 lb to c.l., 13.10c; central, 12.80c and 13.55c; western, 13.45c and 16.50c, fob shipping point, freight allowed. Price per lb contained Si.

Silicomanganese, containing exactly 2 lb Mn and about ½ lb Si, eastern zone, bulk, c.l. 5.80c, ton lots 6.35c; central zone, add 0.25c for c.l. and 1c for ton lots; western, add 0.55c for c.l. and 0.20c for ton lots. **Ferrosilicon,** weighing about 5 lb and containing exactly 2 lb Si, or about 2½ lb and containing exactly 1 lb Si, packed, eastern zone, c.l. 3.90c, ton lots 4.15c, less ton lots 4.45c; central zone, add 0.15c for c.l. and 0.40c for smaller lots; western zone, add 0.30c for c.l. and 0.45c for smaller lots. Prices are fob shipping point, freight allowed; spot prices 0.25c higher. Deduct 0.30c for bulk carlots.

Manganese Metal: (Min. 96% Mn, max. 2% Fe), per lb of metal, eastern zone, bulk, c.l., 30c, 2000 lb to c.l., 32c, central, 30.25c, and 33c; western, 30.55c and 35.05c.

Electrolytic Manganese: 99.9% plus, fob Knoxville, Tenn., freight allowed east of Mississippi on 250 lb or more: Carlots 32c, ton lots 34c, drum lots 36c, less than drum lot 38c. Add 1½c for hydrogen-removed metal.

Manganese-Boron: (Mn 75% approx., B 15-20%, Fe 5% max., Si 1.50% max. and C 3% max.) per lb of alloy. Contract ton lots, $1.89, less $2.01, eastern; freight allowed; $1.903 and $2.023, central, $1.935 and $2.055 western; spot up 5c.

Nickel-Boron: (B 15-18%, Al 1% max., Si 1.50% max., C 0.50% max., Fe 3% max., Ni, balance), per lb of alloy. Contract, 5 tons or more, $1.90, 1 ton to 8 tons, $2.00, less than ton $2.10, eastern, freight allowed; $1.9125, $2.0125 and $2.1125, central; $1.9445, $2.0445 and $2.1445, western; spot same as contract.

Borosil: 3 to 4% B, 40 to 45% Si, $6.25 lb contained B, fob Philo, O., freight not exceeding St. Louis rate allowed.

Bortam: B 1.5-1.9%, ton lots, 45c lb; less-ton lots, 50c lb.

Carbortam: B 0.90 to 1.15% net ton to carload, 8c per lb fob Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

Silicaz Alloy: (Si 35-40%, Ca 9-11%, Al 5-7%, Zr 5-7%, Ti 9-11% and B 0.55-0.75%), per lb of alloy contract, carlots 25.00c, ton lots 26.00c, less ton lots 27.00c, eastern, freight allowed, 25.50c, 26.75c and 27.75c, central; 27.50c, 28.90c and 29.90c, western; spot up 0.25c.

Silvaz Alloy: (Si 35-40%, Va 9-11%, Al 5-7%, Zr 5-7%, Ti 9-11% and B 0.55-0.75%), per lb of alloy. Contract, carlots 58.00c, ton lots 59.00c, less 60.00c, eastern freight allowed; 58.50c, 59.75c and 60.75c, central; 60.50c, 61.90c and 62.90c, western; spot up 0.25c.

SMZ Alloy: (Si 60-55%, Mn 5-7%, Zr 5-7% and Fe approx. 20%) per lb of alloy contract carlots 11.50c, ton lots 12.00c, less 12.50c, eastern zone, freight allowed; 12.00c, 12.85c and 13.35c, central zone; 14.05c, 14.60c and 15.10c, western; spot up 0.25c.

CMSZ Alloy 4: (Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75% and C 3.00-4.50%). Contract carlots, bulk, 11.00c and packed 11.50c; ton lots 12.00c; less 12.50c, eastern, freight allowed; 11.50c and 12.00c, 12.75c, 13.25c, central; 13.50c and 14.00c, 14.75c, 15.25c, western; spot up 0.25c.

CMSZ Alloy 5: (Cr 50-56%, Mn 4-6%, Si 13.50-16.00%, Zr 0.75-1.25%, C 3.50-5.00%) per lb of alloy. Contract, carlots, bulk, 10.75c, packed 11.25c, ton lots 11.75c, less 12.25c, eastern, freight allowed; 11.25c, 11.75c, 12.50c and 13.00c, central; 13.25c and 13.75c, 14.50c and 15.00c, western; spot up 0.25c.

Zirconium Alloy: 12-15%, per lb of alloy, eastern contract, carlots bulk, 4.60c, packed 4.80c, ton lots 4.80c, less tons 5c, carloads, bulk, per gross ton $102.50; packed $107.50; ton lots $108; less-ton lots $112.50. Spot up $5 per ton.

Zirconium Alloy: Zr 35-40%, eastern, contract basis, carloads in bulk or package, per lb of alloy 14.00c; gross ton lots 15.00c; less-ton lots 16.00c. Spot up ¼c.

Alsifer: (Approx. 20% Al, 40% Si 40% Fe) contract basis fob Niagara Falls, N. Y., lump per lb 6.25c; ton lots 6.75c; less 7.25c. Spot up ½c.

Simanal: (Approx. 20% each Si, Mn, Al) Packed, lump, carload 9c, ton lots 9.25c, less-ton lots 9.75c per lb alloy; freight not exceeding St. Louis rate allowed.

Tungsten Metal Powder: Spot, not less than 97%, $2.50-$2.60; freight allowed as far west as St. Louis.

Grainal: Vanadium Grainal No. 1 87.5c; No. 6, 60c; No. 79, 45c; all fob Bridgeville, Pa., usual freight allowance.

Vanadium Pentoxide, technical grade: Fused, approx. 89-92% V_2O_5 and 5.84% NA_2O; or air dried, 83-85% V_2O_5 and 5.15% NA_2O, $1.10 per lb contained V_2O_5, fob plant, freight allowed on quantities of 25 lb and over to St. Louis.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Prices are dollars per gross ton, delivered at consumer's plant except where noted. For complete OPA price schedule refer to MPR-4

OPEN HEARTH AND BLAST FURNACE GRADES

	—Heavy Melting— No. 1	—Heavy Melting— No. 2	No. 1 Busheling	—Bundles— No. 1	—Bundles— No. 2	—Bundles— No. 3	Machine Shop Turnings	Mixed Borings, Turnings	Short Shovel Turnings	Cast Iron Borings
‡New York	15.33	15.33	15.33	....	15.33	13.33	10.33	10.33	12.33	
Philadelphia	18.75	18.75	18.75	18.75	18.75	16.75	13.75	13.75	15.75	14.75
*Boston	14.06	14.06	14.06	14.06	14.06	....	9.06	9.06	11.06	
Cleveland	19.50	19.50	19.50	19.50	19.50	....	14.50	14.50	16.50	13.50–14.00
Pittsburgh	20.00	20.00	20.00	20.00	20.00	18.00	15.00	15.00	17.00	16.00
Valley	20.00	....	....	20.00	....	....	15.00	....	17.00	16.00
Mansfield	....	....	....	....	....	....	15.00	....	....	....
Chicago	18.75	18.75	18.75	18.75	18.75	16.75	13.75	13.75	15.75	14.75
Buffalo	19.25	19.25	19.25	19.25	19.25	....	14.25	14.25	16.25	15.25
‡Detroit	17.32	....	17.32	17.32	17.32	15.32	12.32	12.32	14.32	13.32
St. Louis	17.50	....	....	....	....	....	10.50	....	12.50	....
Cincinnati	19.50	19.50	....	19.50	19.50	....	10.50–11.00	10.50–11.00	12.50–13.00	11.50–12.00
Birmingham	17.00	17.00	17.00	....	17.00	15.00	....	....	12.00	13.00
San Francisco	17.00	17.00	17.00	17.00	17.00	9.00	7.00	....	....	....
Seattle	14.50	14.50	....	....	....	....	....	....	....	....
Los Angeles	14.00	13.00	....	12.00	12.00	....	5.50	5.50	....	....

ELECTRIC FURNACE, FOUNDRY AND SPECIAL GRADES

	Bar Crops and Plate	Cast Steel	Punchings and Plate Scrap	Electric Furnace Bundles	Heavy Turnings	Alloy Free Turnings	Cut Structural and Plate Scrap 1 ft and under	Cut Structural and Plate Scrap 2 ft and under	No 1 Chemical Cast Iron Borings	Tin Can Bundles
Philadelphia	21.25	21.25	21.25	19.75	18.25	....	21.25	....	*16.51	....
‡New York	....	....	17.83	16.33	....	....	17.83	17.33	14.33	....
*Boston	....	....	....	....	....	....	....	....	13.31	....
Cleveland	22.00	....	22.00	20.50	....	....	....	....	....	....
Pittsburgh	22.50	22.50	22.50	21.00	19.50	18.00	22.50	22.00	19.00	16.00
Chicago	....	....	21.25	....	....	....	....	....	....	....
‡Detroit	....	....	19.82	18.32	....	....	....	....	....	....
Birmingham	15.50	....	....	....	....	....	19.00	18.50	....	....
San Francisco	15.50	15.50	....	....	....	7.00	18.00	17.50	....	14.50

STEEL GRADES OF RAILROAD ORIGIN

	No. 1 Heavy Melting R.R. Steel	Railroad Malleable	Axles	Rails: Rerolling	Rails: Random Lengths	Rails: Cut 3-ft and under	Cut 18-in. and under	Railroad Specialties	Uncut Tires	Angles, Splice Bars
Pittsburgh	21.00	22.00	26.00	23.50	21.50	23.50	24.75	24.50	23.50	23.50
Valley	21.00	....	....	....	....	....	....	....	....	....
‡Chicago	19.75	22.00	....	22.25	20.25	22.25	23.50	22.75	....	22.25
St. Louis	....	22.00	24.50	21.00	19.00	21.50	....	....	21.00	21.00
Cincinnati	....	....	....	....	20.50–21.00	....	....	....	....	....
Birmingham	....	....	24.00	20.50	18.50	....	....	....	....	20.50
San Francisco	....	....	24.00	....	18.50	....	....	....	20.50	....
Seattle	14.50	....	....	....	....	....	....	....	....	....

CAST IRON GRADES

	No. 1 Cupola Cast	Charging Box Cast	Heavy Breakable Cast	Stove Plate	Unstripped Motor Blocks	Malleable	Brake Shoes	Clean Auto Cast	No. 1 Wheels	Burnt Cast
‡New York	25.00	21.00	20.00	23.00	20.00	24.00				
*Philadelphia	25.00	21.00	20.00		20.00	24.00	17.75	27.00	22.00	
*Boston	25.00		20.00	23.00				27.00		
Buffalo	25.00	21.00	20.00	23.00	20.00	24.00	17.75	27.00	22.00	17.75
Cleveland	25.00		20.00							
*Pittsburgh	25.00	21.00	20.00	23.00	20.00	24.00	17.75	27.00	22.00	17.75
Los Angeles	25.00	....	....	....	....	....	....	....	....	....
*Chicago	25.00	....	....	....	....	24.00	....	....	....	....
‡Detroit	25.00	....	20.00	....	....	....	....	27.00	....	....
*St. Louis	25.00	21.00	20.00	23.00	....	....	17.75	27.00	22.00	17.75
Cincinnati	25.00	....	20.00	23.00	....	....	....	....	....	....
Birmingham	25.00	....	20.00	23.00	20.00	....	17.75	....	22.00	....
*Seattle	25.00	....	....	....	....	....	....	....	....	....

* Fob shipping point; ‡ fob tracks; ‡ dealers buying prices.

NONFERROUS METAL PRICES

Copper: Electrolytic or Lake from producers in carlots 14.37½c, del. Conn.; less carlots 14.50c, refinery. Dealers may add ¾c for 5000 lb to carload; 1c, 1000-4999 lb; 1½c, 500-999 lb; 2c, 0-499 lb. Casting, 14.12½c, refinery, 20,000 lb or more; 14.37½c, less than 20,000 lb.

Brass Ingot: 85-5-5-5 (No. 115) 15.50c; 88-10-2 (No. 215) 18.75c; 80-10-10 (No. 305) 18.25c; No. 1 yellow (No. 405) 12.50c; carlot prices, including 25c per 100 lb freight allowance; add ¼c for less than 20 tons.

Zinc: Prime western 9.25c, select 9.35c, brass special 9.50c, intermediate 9.75c, E. St. Louis; high grade 10.25c, del., carlots. For 20,000 lb to carlots add 0.15c; 10,000-20,000 lb 0.25c; 2000-10,000 lb 0.4c; under 2000 lb 0.50c.

Lead: Common 8.10c, chemical 8.20c, corroding, 8.20c, E. St. Louis for carlots; add 5 points for Chicago, Minneapolis-St. Paul, Milwaukee-Kenosha districts; add 15 points for Cleveland - Akron - Detroit area, New Jersey, New York state, Texas, Pacific Coast, Richmond, Indianapolis-Kokomo; add 20 points for Birmingham, Connecticut, Boston - Worcester, Springfield, New Hampshire, Rhode Island.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lb and over; add ½c 2000-9999 lb; 1c less through 2000 lb.

Secondary Aluminum: Piston alloy (No. 122 type) 14.50c; No. 12 foundry alloy (No. 2 grade) 14.12½c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1 (95-97½%) 15.00c; grade 2 (92-95%) 13.75c; grade 3 (90-92%) 13.50c; grade 4 (85-90%) 13.00c. Above prices for 30,000 lb or more; add ¼c 10,000-30,000 lb; ½c 5000-10,000 lb; ¾c 1000-5000 lb; 1¼c less than 1000 lb. Prices include freight at carload rate up to 75c per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, 17 lb) 20.50c per lb, carlots; 22.50c 100 lb to c.l. Extruded 12-in. sticks 27.50c, carlots; 29.50c 100 lb to c.l.

Tin: Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lb, 1½c 1000-2239, 2½c 500-999. 3c under 500. Grade A, 99.8% or higher (includes Straits), 52.00c; Grade B, 99.8% or higher, not meeting specifications for Grade A, with 0.05% max. arsenic, 51.87½c; Grade C, 99.65-99.79% incl. 51.62½c; Grade D, 99.50-99.64% incl., 51.50c; Grade E, 99-99.49% incl. 51.12½c; Grade F, below 99% (for tin content), 51.00c.

Antimony: American bulk carlots fob Laredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 14.50c; 99.8% and over (arsenic, 0.05% max.; other impurities, 0.1% max.) 15.00c. On producers' sales add ¼c for less than carload to 10,000 lb; ½c for 9999-224 lb; and 2c for 223 lb and less; on sales by dealers, distributors and jobbers add ½c, 1c, and 3c, respectively.

Nickel: Electrolytic cathodes, 99.5%, fob refinery 35.00c lb; pig and shot produced from electrolytic cathodes 36.00c; "F" nickel shot or ingot for additions to cast iron, 34.00c.

Mercury: Open market, spot, New York, $95-$98 per 76-lb flask.

Arsenic: Prime, white, 99%, carlots, 4.00c lb.

Beryllium-Copper: 3.75-4.25% Be, $14.75 per lb contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks, and all other "regular" straight or flat forms $1.25 lb, del.; anodes, balls, discs and all other special or patented shapes, $1.30.

Cobalt: 97-99%, $1.50 lb, for 550 lb (bbl.); $1.52 lb for 100 lb (case); $1.57 lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Indium: 99.9%, $2.25 per troy ounce.

Silver: Open market, N. Y. 90.12½c per ounce.

Platinum: $70.50 per ounce.

Palladium: $24 per troy ounce.

Iridium: $125 per troy ounce.

Rolled, Drawn, Extruded Products

(Copper and brass product prices based on 14.37½c, Conn., for copper. Freight prepaid on 100 lb or more.)

Sheet: Copper 25.81c; yellow brass 23.67c; commercial bronze, 95% 26.14c, 90% 25.81c; red brass, 85% 24.98c, 80% 24.66c; best quality 24.38c; phosphor bronze, grade A 4% or 5%, 43.45c; Everdur, Duronze or equiv., hot rolled, 30.88c; naval brass 28.53c; manganese bronze 31.99c; muntz metal 26.78c; nickel silver 5% 32.38c.

Rods: Copper, hot rolled 22.16c, cold drawn 23.16c; yellow brass 18.53c; commercial bronze, 95% 25.83c, 90% 25.50c; red brass, 85% 24.67c; 80% 24.35c; best quality 24.07c; phosphor bronze, grade A 4% or 5% 43.70c; Everdur, Duronze or equiv. cold drawn, 29.82c; naval brass 22.59c; manganese bronze 25.93c; muntz metal 22.34c; nickel silver 5% 34.44c.

Seamless Tubing: Copper 25.85c; yellow brass 26.43c; commercial bronze 90% 28.22c; red brass 85% 27.64c, 80% 27.32c; best quality brass 26.79c; phosphor bronze, grade A 5% 44.70c.

Copper Wire: Bare, soft, fob eastern mills, carlots 19.89c, less carlots 20.39c; weatherproof, fob eastern mills carlot 22.07c, less carlots 22.57c; magnet, delivered, carlots, 23.30c, 15,000 lb or more 23.55c, less carlots 24.05c.

Aluminum Sheets and Circles: 2s and 3s flat mill finish, base 30,000 lb or more del.; sheet widths as indicated; circle diameter 9" and larger:

Gage	Width	Sheets	Circles
.249"-7	12"-48"	22.70c	25.20c
8-10	12"-48"	23.20c	25.70c
11-12	26"-48"	24.20c	27.00c
13-14	26"-48"	25.20c	28.50c
15-16	26"-48"	26.40c	30.40c
17-18	26"-48"	27.90c	32.90c
19-20	24"-42"	29.80c	35.30c
21-22	24"-42"	31.70c	37.20c
23-24	3"-24"	25.60c	29.20c

Lead Products: Prices to jobbers; full sheets 11.25c; cut sheets 11.50c; pipe 9.90c, New York, 10.00c Philadelphia, Baltimore, Rochester and Buffalo, 10.50c Chicago, Cleveland, Worcester and Boston.

Zinc Products: Sheet fob mill, 14.15c, 36,000 lb and over deduct 7%, Ribbon and strip 13.25c; 3000-lb lots deduct 1%, 6000 lb 2%, 9000 lb 3%, 18,000 lb 4%, carloads and over 7%. Boiler plate (not over 12") 3 tons and over 12.00c; 1-3 tons 13.00c; 500-2000 lb 13.50c; 100-500 lb 14.00c; under 100 lb 15.00c. Hull plate (over 12") add 1c to boiler plate prices.

PLATING MATERIALS

Chromic Acid: 99.75%, flake, del., carloads 16.25c; 5 tons and over 16.75c; 1-5 tons 17.25c; 400 lb to 1 ton 17.75c; under 400 lb 18.25c.

Copper Anodes: In 500-lb lots, fob shipping point, freight allowed, cast oval over 15 in., 25.125c; curved, 20.375c; round oval straight, 19.375c; electro-deposited, 18.875c.

Copper Carbonate: 52-54% metallic Cu, 250 lb barrels 20.50c.

Copper Cyanide: 70-71% Cu, 100-lb kegs or bbls 34.00c, fob, Niagara Falls.

Sodium Cyanide: 96%, 200-lb drums 15.00c; 10,000-lb lots 13.00c fob Niagara Falls.

Nickel Anodes: 500-2999 lb lots; cast and rolled carbonized 47.00c; rolled depolarized 48.00c.

Nickel Chloride: 100-lb kegs or 275-lb bbls 18.00c lb, del.

Tin Anodes: 1000 lb and over 58.50c del.; 500-999 59.00c; 200-499 59.50c; 100-199 61.00c.

Tin Crystals: 400 lb bbls 39.00c fob Graselli, N. J.; 100-lb kegs 39.50c.

Sodium Stannate: 100 or 300-lb drums 36.50c, del.; ton lots 35.50c.

Zinc Cyanide: 100-lb kegs or bbls 33.00c fob Niagara Falls.

Scrap Metals

Brass Mill Allowances: Prices for less than 15,000 lb fob shipping point. Add ¾c for 15,000-40,000 lb; 1c for 40,000 or more.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	12.000	12.000	11.250
Yellow brass	9.875	9.625	9.125
Commercial bronze			
95%	11.250	11.000	10.500
90%	11.125	10.875	10.375
Red Brass			
85%	10.875	10.625	10.125
80%	10.875	10.625	10.125
Best quality (71-79%)	10.500	10.250	9.750
Muntz metal	9.250	9.000	8.500
Nickel silver, 5%	10.500	10.250	.....
Phos. br., A, B, 5%	12.750	12.500	11.500
Naval brass	9.500	9.250	8.750
Manganese bronze	9.500	9.250	8.750

Other than Brass Mill Scrap: Prices apply on material not meeting brass mill specifications and are fob shipping point; add ¾c for shipment of 60,000 lb of one group and ½c for 20,000 lb of second group shipped in same car. Typical prices follow:

(Group 1) No. 1 heavy copper and wire, No. 1 tinned copper and copper borings 11.50c; No. 2 copper wire and mixed heavy copper, copper tuyeres 10.50c.

(Group 2) Soft red brass and borings, aluminum bronze 10.75c; copper-nickel solids and borings 11.00c; lined car boxes, cocks and faucets 9.50c; bell metal 17.25c; babbitt-line brass bushings 14.75c.

(Group 3) Admiralty condenser tubes, brass pipe 8.75c; muntz metal condenser tubes 8.25c; old rolled brass 8.25c; manganese bronze solids; (lead 0%-0.40%) 8.00c; (lead 0.41%-1%) 7.00c; manganese bronze borings, 7.25c.

Aluminum Scrap: Price fob point of shipment, truckloads of 5000 pounds or over; Segregated solids, 2S, 3S, 5c lb, 11, 14, etc., 3 to 3.50c lb. All other high grade alloys 5c lb. Segregated borings and turnings, wrought alloys, 2, 2.50c lb. Other high-grade alloys 3.50c, 4.00c lb. Mixed plant scrap, all solids, 2, 2.50c lb borings and turnings one cent less than segregated.

Lead Scrap: Prices fob point of shipment. For soft and hard lead, including cable lead, deduct 0.75c from basing point prices for refined metal.

Zinc Scrap: New clippings 8.00c, old zinc 6.50c, fob point of shipment, add ½c for 10,000 lb or more. New die cast scrap 5.70c, radiator grilles 5.70c, add ½c for 20,000 lb or more. Unsweated zinc dross, die cast slab 6.55c, any quantity.

Nickel, Monel Scrap: Prices fob point of shipment; add ½c for 2000 lb or more of nickel or cupro-nickel shipped at one time and 20,000 lb or more of monel. Converters (dealers) allowed 2c premium.

Nickel: 98% or more nickel and not over ½% copper 23.00c; 90-98% nickel, 23.00c per lb nickel contained.

Cupro-nickel: 90% or more combined nickel and copper 26.00c per lb contained nickel, plus 8.00c per lb contained copper; less than 90% combined nickel and copper 26.00c for contained nickel only.

Monel: No. 1 castings, turnings 15.00c; new clipping 20.00c; solder sheet 18.00c.

Sheets, Strip . . .

Galvanized sheet producers may get subsidy on shipments to West Coast. Speculative buying and selling revealed

Sheet & Strip Prices, Page 250

Pittsburgh — Hot and cold-rolled galvanized sheets soon are expected to be put under a subsidy plan. While not officially decided, the plan entails payment of $10 per ton on shipments of 24 gage and lighter galvanized sheets exceeding company's quota of 90 per cent of third-quarter output. The premium would apply on hot and cold-rolled sheet shipments to West coast only. Another plan is under consideration which would permit producers to ship all-rail to West coast on basis of customer absorbing freight.

It is uncertain whether OPA announcement decontrolling alloys covers low-alloy high strength steel and high silicon electrical sheets. However, these items are not priced on an alloy base, and therefore probably are still under price control. No significant price adjustments for alloy strip products recently decontrolled are contemplated at the moment, but much depends on future production cost trend.

Rated sheet tonnage scheduled for shipment this quarter is little changed on a monthly basis from that recorded during August and September.

Cleveland — While recognizing that actual demands for sheet steel are extremely heavy, producers maintain that the apparent shortage is due in large measure to overbuying by consumers and "speculative" buying by many interests. For instance, three letters addressed to nonexistent steel producers were delivered to the offices here of the company which had absorbed them several years ago. Each of these letters was from same buyer and each contained an order for 500 tons of galvanized steel sheets. Undoubtedly similar orders were sent to other producers. Actual requirements of this customer was much less then 500 tons. Another indication of "speculative" buying is the appearance of large offerings of "black market" steel in the midwest. One specific offering last week was 2500 tons of cold-rolled sheet steel, 14 to 26 gage, at $140 a ton. Other flat rolled material, including both hot and cold-rolled, is being offered at $125 to $200 a ton.

Chicago — Two district sheetmakers now have opened their books for 1947 business. Carnegie-Illinois Steel Corp. made this move last week, having estimated its yearend position as regards carryover tonnage and arrived at customer quotas for first and second quarter. Business will be accepted only to midyear. For some time, pressure from customers for quota information has been heavy, and now that this has been worked out is expected to prove disappointing. Another sheetmaker is experiencing good results in finding customers willing to cancel tonnages which will not be produced and shipped this year and in filing specifications against 1947 quotas.

New York — Stringency continues in sheets, and while some large producers have set up quotas for their customers for first quarter, there are still some who have not, preferring to wait a little longer until they know more definitely what capacity they will have available. On hot and cold sheets, some producers are confident they will be behind at least two months on their commitments for the current quarter by the time the new year rolls around, and on galvanized some will have at least three months arrearages.

St. Louis—Sheet production continues to improve but there is no letup in pressure. Although 1947 books will not be opened before February, inquiries from remote points are unabated. Production this week is expected to reach capacity, with Granite City Steel blowing in the last of three DPC open hearths. A 5000-ton cutback this month in the plant's pig quota however, may prevent full operation in December.

Cincinnati — Sheet mills in this district are maintaining production at high levels but are unable to cut delivery time because of priority tonnage for housing and hardship cases. They also are withholding any announcement about the opening of books for the first quarter. Such announcement, when it comes, will be more or less of a gesture. An eight-weeks' carryover is possible in cold-rolled, with heavy arrearage in other products, added to recurrent commitments.

Boston—Confusion in flat-rolled schedules is foreseen through first quarter. Heavy carryovers, another priority quarter for housing and closed reservations permit few openings for new carbon sheet tonnage or strip. Producers are taking no new orders thus far and in one case August volume in hot strip is only now beginning to move out. Cold strip shipments also are behind schedule. Those with books open are unable to accept much volume for first quarter. Deep-drawing stock is frequently delayed by rejected heats. More consumers complain of steel shortages, but inventory positions as the year-end approaches is by no means uniform. Deferment of shipments is asked occasionally, although flat-rolled is seldom involved, as consumers' steel and component inventories become relatively long on some items and short on others. This is building up to some degree toward deferment of scattered shipments despite the possibility of production slackening over labor demands. There are indications also sections of the automobile industry are trimming shipments more in line with current consumption and potential assemblies over the months ahead. They are deferring deliveries only on steel products in better supply. Some consumers are seeking new permanent supply sources, following absorption of one independent by a fabricating interest.

Steel Plates . . .

Plate Prices, Page 251

Boston—Considering the slump in new ship construction, demand for floor plates is heavy with deliveries in January in contrast to carbon steel plates on which most mills are filled through first quarter. Bolstering demand for floor plates are requirements of a Connecticut shipyard which is branching out into other types of fabrication, including that of truck bodies. Mills are making practically no progress against backlogs and pressure for tonnage is generally strong, although paradoxically a deferment on 500 tons of carbon plates has developed.

New York—The plate situation continues as tight as at any time in recent months, with much interest shown in the outcome of present discussions on the need for setting up broader allocations for car steel. This question may be decided one way or the other at a meeting scheduled in Washington for Nov. 14. Meanwhile, some directives have been issued on plates, possibly 20,000 to 22,000 tons, for 1100 special tank cars. Strong miscellaneous demand continues, but with special interest in light gage sheets, $\frac{3}{16}$ and $\frac{1}{4}$ inch in thickness. At least a few plate producers are sold out completely for the first half.

Philadelphia — Due to continued active demand and restricted production because of shortage of raw materials, district plate producers report a further increase in backlogs. Some sheared mills have nothing to offer for the first half, and in some instances are offering only limited tonnages for the third quarter. Because of easier deliveries, floor plates are being bought occasionally for purposes other than for providing treads.

Steel Bars . . .

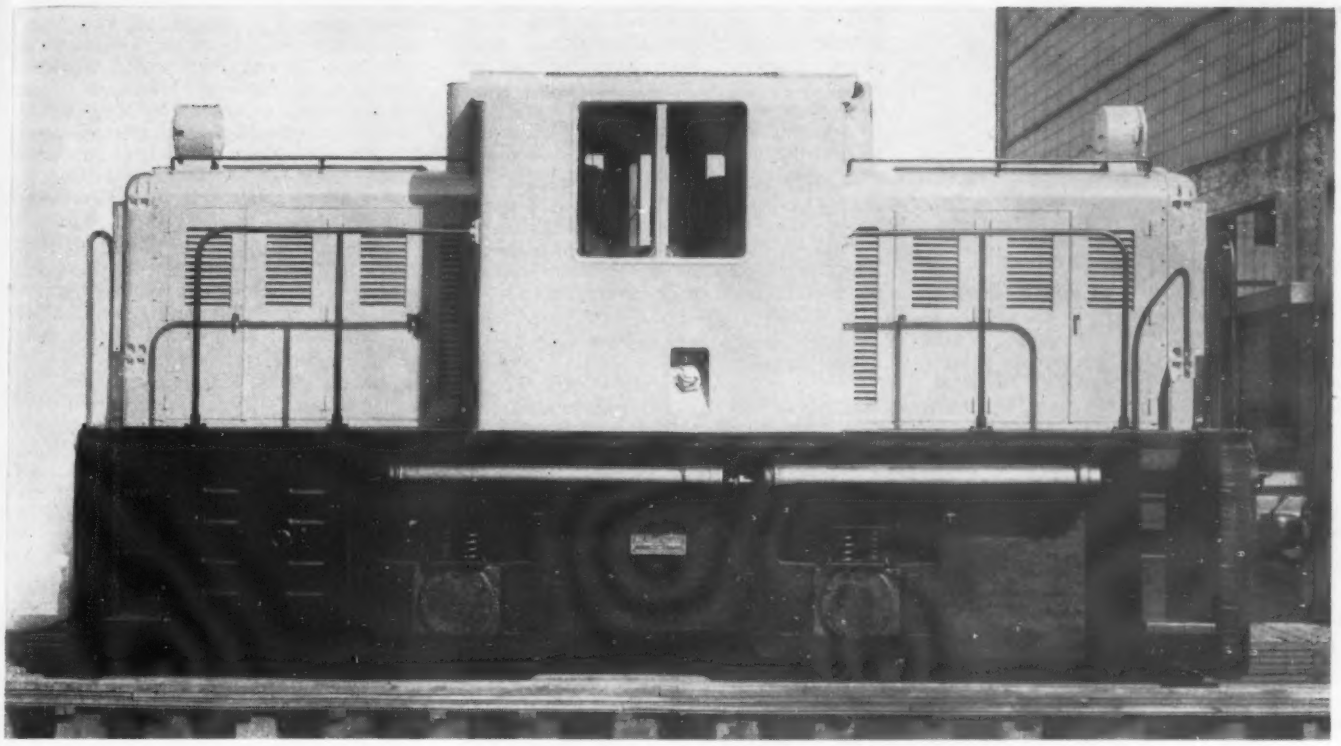
No general upward revision in alloy prices expected, following decontrol action. Some adjustments pend

Bar Prices, Page 250

Pittsburgh—With alloy steel production currently less than 50 per cent of wartime peak output, most sellers do not anticipate any significant upward revision in prices following OPA decontrol Nov. 1. However, some consideration is being given rounding-off present base prices to facilitate calculation of actual delivered price. Present base quotations include fractional cents resulting from percentage increases granted by OPA last spring. It is also pointed out that the average $5 per ton increase granted on carbon steels last spring was greater percentagewise than that permitted on alloys, thus narrowing the long standing price spread between the two grades. Some interests are said to be considering raising alloy spring steel flats prices, but no official action is reported.

Boston—Bar deliveries vary with size and grade, ranging from three to four weeks on stainless to second quarter on small carbon. Most schedules under one-inch on cold-drawn carbon are filled. Demand in this area is concentrated largely in smaller sizes and is reflected in longer deliveries on fabricated products made from these sizes. Small bolts and nuts are the most extended in fasteners, improving as diameters increase. An integrated bolt and nut division, for instance, can make December delivery on bolts one-inch diameter and larger, but is indefinite on smaller and shorter sizes. Forge shop quotas for first quarter are being held under pressure, notably in the wrench and small forged tool field where demand is heavy.

New York—Some hot carbon bar sellers report they are now booked up for the entire first quarter on all standard sizes of flats and rounds. Others are in the same position with respect to the smaller sizes and this applies also to drawers of cold carbon steel bars. The situation in hot and cold alloy bars, however, continues relatively much easier.



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Wire . . .

Wire Prices, Page 251

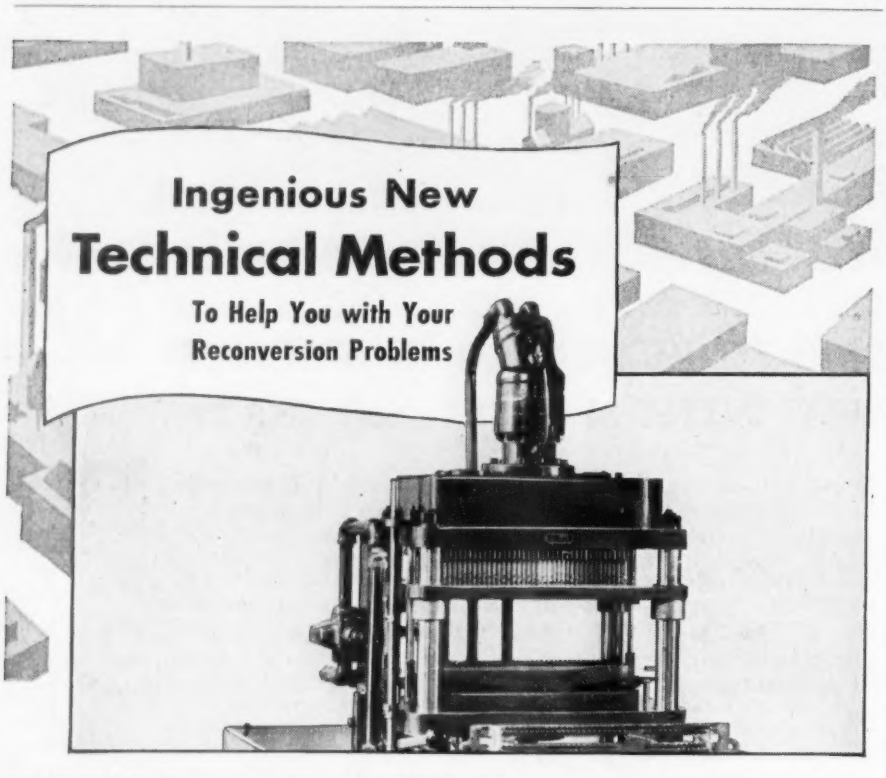
Pittsburgh — Sellers do not anticipate an adjustment in wire rope or strand prices in near future, following decontrol of these items Nov. 1. Consumer inventories of both these products are in good shape and production is in balance with demand. In the case of wire rope considerable war surplus tonnage still has to be absorbed.

Reports continue that black marketing of nails is holding up the housing program, but this situation soon should be remedied under government's premium payment plan which is expected to increase output to a monthly rate of 75,000 to 80,000 tons by close of year. Mills report no effort will be made to schedule forward commitments accepted on a tentative basis for first-quarter shipment until probable carryover tonnage can be determined more accurately. In some instances sellers for past three months have refused to accept new orders even on a tentative basis.

Output of valve spring wire has been aided somewhat through imports of wire rods from Sweden. Shortage of wire rods continues to restrict output of nonintegrated wire producers.

New York—Carryovers in spring and high-carbon wire will be especially heavy at the year-end. Production of low-carbon wire is restricted by profit margin factors and to secure material many users are forced to go to higher carbon wire at higher prices. Decontrol of wire prices undoubtedly will mean some vertical increases in prices involving low-carbon grades, among others. Wire rod supply has not eased, nonintegrated mills report. Fabricators are short of bedding and upholstery spring wire which is as scarce as any grade. Until recently some surplus was available, but this has been about cleaned out.

Boston—Requests for deferred shipments of wire are appearing in minor volume from automobile parts suppliers. Some valve and flat spring wire orders have been held back, but this move is by no means uniform; other types of wire, including cushion spring material, are under pressure. Wire mills will go into the new year with large carryovers on many items, notably high carbon specialties on which processing determines lead-time. Rod supply remains critical and most nonintegrated mills are operating on a hand-to-mouth basis. Rejected heats are hampering production due to off-grade scrap. While not meeting original specification, this material is sometimes processed and accepted by consumers anxious for wire.



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Structural Shapes . . .

Mills make good progress in reducing top-heavy order backlogs, as government restricts new projects

Structural Shape Prices, Page 251

Boston—Most tonnage building projects are under contract or held in abeyance and active pending volume is lowest in the postwar period. Nevertheless, new authorizations include a power plant, Cambridge, Mass., utility and a junior college, Newton, Mass. Limited volume of bridge inquiry is out for starting next spring, highway programs being behind schedule this year.

High costs and shortages of materials increasingly affect construction planning. Shortages of some materials, including reinforcing bars, are more severe than that of structural steel.

Deliveries on fabricated steel against new orders are well into second quarter. One of the largest Pennsylvania shops has lost close to 60,000 tons this year by direct and indirect strikes, loss of one month's output being due to power strike at Pittsburgh. With few exceptions, structural mills for some weeks now have been scheduled heavily and with continuance of current high level ouput they should make good progress in reducing order backlogs during next quarter. District fabricators are well supplied with small-lot work at good prices with steel costs estimated at warehouse quotations. Nearly every project is rounded out with warehouse steel and some are fabricated almost entirely from warehouse steel. Norton Co., machine tool builder, Worcester, Mass., is completing erection of a sizable addition which the company was obliged to fabricate to meet delivery, buying plain material in the spot market.

Pittsburgh — Government construction limitation regulations have made it possible for many fabricators to make considerable headway against top-heavy order backlogs. Mills are hopeful of substantially reducing carryover tonnage on standard shapes before close of year, but

there is little prospect of accomplishing this on wide flange beams.

Further easing in structural mill delivery schedules for Carnegie-Illinois Steel Corp.'s customers should result from the resumption of shape production late this month at the Geneva Steel Co.'s plant. At that time the corporation is expected to announce their base price on structurals at Geneva.

Chicago—Operations of structural fabricating shops are limited by the amount of steel they are able to get from mills, consequently new business is not sought. Despite the fact that CPA maintains a heavy hold on new construction, denying many requests for approval, and the added fact that high costs are resulting in postponement of many projects, the volume out for bids is more than fabricators can take on. Although there is no indication that supply of plain shapes from mills is loosening up in this district, fabricators hope that 1947 will bring an improvement in this direction and that they will be able to lift the level of shop operations.

New York—Leading structural inquiry involves 7000 tons for the Lillian Wald housing development, on which the New York City Housing Authority will open general contractors bids Dec. 3. A few other housing projects also are active, but they are requiring reinforcing steel, for the most part. Little new construction work has been placed recently, although there is a fair scattering of inquiry.

Seattle—Fabricating shops are as busy as restricted supplies will permit. Only small emergency jobs are being taken, larger projects being declined until more steel arrives from the East. As far as possible, shipments have been diverted from water to rail but considerable steel is aboard ship and unavailable, due to the strike. One local plant states February delivery can be made on small jobs.

Philadelphia — Structural inquiry is light, due to limitations on nonhousing construction and high costs. Orders for new construction are scattered.

Tin Plate . . .

Tin Plate Prices, Page 251

Chicago — Consumers of tin plate report inventories are running dangerously low, consequently they press producers for quick deliveries and seek to get increased quotas. Despite an uncomfortably tight car situation, tin plate makers have been able to keep material moving out without undue interruption but they are powerless to raise quotas in face of limited steel supply and steady strong demand. CPA, which recently canceled export shipments because of the maritime strike has now reinstated shipments from the east coast and gulf ports, but the ban still holds for west coast ports.

Pittsburgh — Production of tin mill products next quarter is not expected to register much change from scheduled output this period of about 850,000 tons, including 135,000 tons for export. Some new cold-reduction capacity should be available early next year, but no significant increase in tin plate output is probable until seasonal food pack requirements again have to be met, particularly in view of the terrific pressure for cold-reduced sheets and strip indicated through most of the year. Price basis on 1947 tin plate shipments has not yet been determined and this action is expected to be delayed as long as possible in view of present uncertain status of OPA. Sellers report receipt of initial first-quarter export directive of 55,000 tons for early scheduling.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 251

Chicago—Although denial of CPA approval for construction and rising building costs are operating to reduce the demand for reinforcing material, volume of business seeking placement exceeds the ability of suppliers to book. Numerous projects go begging for lack of takers. This situation is not likely to improve over the balance of this year, and the only hope is that 1947 quotas of reinforcing steel in 1947 will permit expanded operations.

New York—Several housing developments of reinforced steel construction are before the trade here. One of the largest, the Marcy housing development in Brooklyn, involves 4000 tons, and another, the Johnson housing development, requires 2600, the latter having been pending for several weeks. Other housing projects involve the Amsterdam on West End Ave, between 61st and 64th streets, and the Jacob Riis and Elliott, referred to in previous issues. However, reinforcing steel continues extremely scarce.

Seattle — One local rolling mill has opened first quarter books but another is holding off until backlog is reduced

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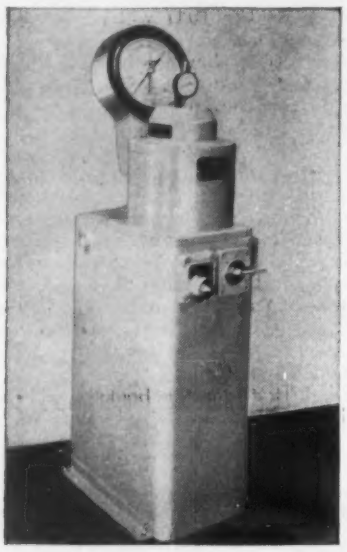

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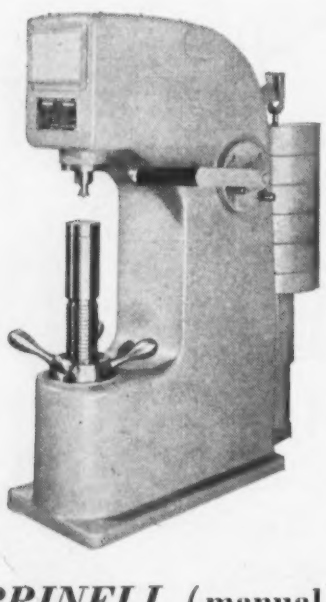

BRINELL (manual)

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Standard equipment furnished with machine, consists of a Flat Anvil also "Vee" Anvil for testing of "rounds" and a standard Brinell Microscope with micrometer scale and case . . . Send for your 16 page catalog.

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and conditions to be faced in 1947 are more definite. Demand for both reinforcing and merchant bars continues strong although recent orders are mostly less than 100 tons each. Both mills have heavy backlogs, one plant reporting deliveries cannot be guaranteed in less than six months. Operations are at high peak. Labor turnover is less pronounced but efficiency is below normal. Completion of current contracts is the objective at the moment.

Pig Iron . . .

Pig Iron Prices, Page 253

Pittsburgh — Some blast furnace interests believe pig iron prices will be increased $2 to $3 a ton should they be decontrolled; for some high cost units higher advances are likely. This price move would not take into consideration the effect of possible higher cost of iron ore and coke developing out of another round of wage advances expected early next year. Critical pig iron supply situation should continue for some time, although it is hoped some relief will result from government's premium payment plan for boosting output of foundry and malleable iron. Foundry operations remain well below capacity due to iron shortage, a situation that has been accentuated by scarcity of cast scrap. Indications are volume of certified tonnage produced over remainder of this year will record little change from October requirements, with result those foundries not coming within scope of CPA's program will have to scramble for limited tonnage available. There are 48 out of 54 blast furnaces active in this district.

Chicago — Shortages of iron, coke and manpower continue to restrict output of foundries in this district and little headway can be made in denting the tremendous backlog of castings orders.

Inland Steel Co. last week lighted the DPC blast furnace which it has just purchased from the government, and at the same time will fulfill its obligation made to the housing agency to provide between 20,000 and 24,000 tons per month of merchant pig iron from its own furnaces for use in the veterans' housing program and so long as it qualifies for the $8 per ton subsidy. This operation was made possible by speedy ruling of the Justice Department on legality of the Inland purchase and by some easing in the coal strike threat.

Buffalo—Nearby foundries continue to press for iron as increased shipments move into the New England territory and additional iron moves into steel furnaces here. District iron output jumped six points to 93½ per cent of capacity as a mill producer relighted a stack that had been idle for more than three weeks. The stack resumed on basic iron. Ore supplies are becoming more of a problem. Foundries find a sharp increase in the number of workers shifting from one job to another, which is a handicap to operations. The area U. S. Employment Service office also warns of production lost by transferral of workers.

Boston—Pig iron supply is expected to improve by next month. Output from the Mystic furnace will begin going to consumers late this month and one New York stack shipping to this area has gone on foundry grades. Relief is also in sight for basic pig iron users. Steelworks are still operating on close iron supply margins. Pressure for scrap is expected to ease indirectly as the iron ratio in the melt rises. An improvement in quality of castings and steel melts will logically follow eventually, permitting closer controls in melting practice. So scrace has been iron, many consumers have been taking what they could get almost regardless of analysis.

Philadelphia — Following a week's production of basic iron, one district furnace has been shifted over to foundry iron again and is expected to continue on this grade for at least another two or three weeks. Rated requirements for November are about the same as in October and will be taken care of in full. Shipments to nonrated consumers will be curtailed. One district furnace which recently was supplying basic is now turning out low phos iron. With some foundries shortage of coke constitutes a greater bottleneck than pig iron. Some relief is being provided by foundry beehive coke, particularly from the West Virginia districts, and by a greater use of anthracite.

Scrap . . .

Scrap supplies remain dangerously low with collections adversely affected by present price schedules

Scrap Prices, Page 254

Pittsburgh—Scrap industry is not optimistic over possible price decontrol in the near future, although consensus of steel producers, dealers and brokers is that a price advance or decontrol is the only sound procedure to encourage collection of remote material and speed the flow of badly needed scrap to consumers' yards.

Producers' stocks here are somewhat better, although inventories are rapidly becoming depleted with incoming receipts representing about 30 per cent of normal. Bulk of current scrap receipts is originating directly from fabricators, with dealers making little effort to collect and prepare material under present price schedules. Nearly all producers have been forced to obtain permission to use low phos scrap in open hearth operations, and some interests state quality of this material is well below standard with many rejections necessary even in face of critical tight supply. Upgrading has been a common practice for some time now, but recent shipments also have included considerable foreign alloying material.

Specialty steel producers' operations have been adversely affected as result of integrated steel mills remelting all their billet, bloom and forge crop scrap due to elimination of these items as a separate listing under classification 13 in amendment 8 to MPR-4.

Chicago—Inventory limits on scrap are almost meaningless, for no consumer in this district is close enough to the limits to bring them into consideration. Demand for melting material far exceeds available supply and ceiling prices prevail on all transactions. Usual sources of supply failing to turn up tonnage required, mills and foundries are forced to use their own initiative in locating and earmarking for shipment to them whatever scrap can be uncovered. Steelmaking operations are holding in the neighborhood of 92 per cent of capacity and will continue near this level so long as raw material supply

will permit. However, with winter not far off, interruptions to shipments of scrap hold a threat.

Cincinnati—District mills are operating at a high level, melting scrap as fast as it is received. The situation carries an underlying threat of a forced decrease in steel supply through lack of adequate scrap some time this winter. Some foundries, partly because of scrap shortage, have reduced the melt and there are cases where cast has been accepted after excessively long freight hauls. Flow of production scrap is unimproved, and country scrap is all but non-existent.

St. Louis — Scrap stockpiles have reached a new low, with few mills having more than two weeks' supply. Shipments continue to shrink and no improvement is anticipated before the first of the year. Some dealers are reported holding back for income tax purposes and on the debatable prospect of price decontrols soon. Foundry reserves are spotty, some slightly above two weeks and others near the vanishing point. Predictions of several shutdowns are being heard again.

Buffalo—More and more disgust is expressed by scrap dealers over the continuance of OPA controls as less and less scrap is reported coming out. New business, however, is reported with considerable upgrading of material. Little, if any, material is moving strictly within OPA compliance.

Philadelphia — In light of political developments, talk of price decontrol is greater than ever in the scrap market, retarding the movement of material. Consensus of interests here is that action will be taken at least soon after Congress convenes in January. Meanwhile, steel mills in this district generally continue to operate on a restricted basis. At least two mills are operating at less than 30 per cent of capacity, with shortage of pig iron also a restrictive factor. Producers believe that unless there is some change in scrap prices the shortage of this material will become more acute as winter approaches, since no inventories are being built up in any quarter. Stringency in all cast grades continues. Red tape is holding up considerable scrap, consumers declare.

Detroit — Doubtless stimulated by election results, expectations for early decontrol of scrap prices are on the ascendancy, but with stocks nearly depleted, there is little incentive to hold material for the price rise which is certain to follow decontrol. No automotive lists have appeared for bids for several months, scrap sources channeling their supplies to mills on a semibarter basis. Reduction in assembly schedules by Chrysler Corp. has meant some falling off in scrap from this source; not as seriously as might be imagined, however, because of the accompanying step-up in replacement parts production by Chrysler divisions.

Ferroalloys . . .

Ferroalloy Prices, Page 253

New York — Alsifer has been advanced, effective as of Nov. 1. This ferroalloy, approximately 20 per cent Al, 40 per cent Si, 40 per cent Fe on a contract basis, fob Niagara Falls, N. Y., is now holding at 6.25c per lb, lump, against 5.88c; 6.75c in ton lots, against 6.38c; and 7.25c in less than ton lots, against 6.88c. Spot prices are observing the usual differential of ½-cent above contract levels.

Nonferrous Metals . . .

Production of major metals tends upward but consumers' inventories remain short or unbalanced

Nonferrous Prices, Page 255

New York — While production of most major nonferrous metals and products fabricated of them is rising, inventories are short or unbalanced with many consumers.

Copper: Consuming industries are still short of copper and copper alloy products, which is the result of earlier strikes and production stoppages. About 50,000 tons of copper is being released from the government stockpile this month, but fabricators in some cases claim allocations are not sufficient to maintain operations.

Difficulty in securing foreign copper for replacement of withdrawals is manifest with Chilean output reduced by strikes. Foreign copper prices tend higher and around 17.50c, fas, would have to be paid for new tonnage now. Demand is strong but foreign offerings are light because of the sold-up position of most producers.

In the domestic copper market, some shapes are still scarce. October deliveries totaled about 112,000 tons. Novelty jewelry makers are returning to brass from injection molded plastic parts.

Zinc: Demand for zinc for galvanizing and die casting purposes is heavy. The grades used, prime western and special high grade, are shipped out as promptly as produced. Other grades are less tight. Existing shortages are in special grades.

Lead: Strong arguments for decontrol of lead are contained in the opinion of leading market interests that shortages are due to provisions of existing price regulations. For December delivery, producers are accepting only a small part of the total orders offered. Metal is being allocated sparingly in an effort to spread the supply as far as possible.

Aluminum: Because of an expected aluminum shortage this winter, aluminum producers have recommended to the government that it explore the possibilities of a three-way purchase contract with Canada and Great Britain. Representatives of the industry have told CPA that the impact of the huge requirements of aluminum for housing on an already tight aluminum supply requires some government purchase program to relieve a possible shortage over the next three months. It is estimated that the NHA's aluminum-house program will require some 400,000 pounds of aluminum in 1947, about one-third of the estimated supply. This supply was computed on the basis of current monthly output of 90 million pounds, plus a government stockpile of 170 million pounds.

Even though power shortages and other factors have cut Canadian production to about 40 per cent of capacity, the Canadian supplies are still sufficient to relieve the immediate shortage facing United States aluminum rolling mills,

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industry representatives claim. Canada is stockpiling aluminum ingots now for shipment to Great Britain next spring.

Iron Ore . . .

Iron Ore Prices, Page 252

Shipments of Lake Superior iron ore in October totaled 9,209,304 gross tons, compared with 9,826,622 tons in October, 1945, a decline of 617,318 tons, 6.28 per cent, according to the Lake Superior Iron Ore Association, Cleveland. In September shipments were 9,636,353 tons. Details of October shipments are as follows:

	October, 1946	October, 1945
Escanaba	493,206	478,484
Marquette	418,027	557,142
Ashland	628,193	550,856
Superior	3,176,649	3,267,999
Duluth	2,299,671	2,749,682
Two Harbors	1,985,198	2,120,888
Total U.S. Ports	9,000,944	9,725,051
Michipicoten	49,311	70,621
Port Arthur	159,049	30,950
Total Canada	208,360	101,571
Grand total	9,209,304	9,826,622

Decrease from year ago, 617,318 tons, 6.28 per cent.

Cumulative shipments to Nov. 1 totaled 52,468,938 tons, compared with 71,498,393 tons in the comparable period last year, a decline of 19,029,455 tons, 26.62 per cent. Part of this gap may be made up in November as pressure for ore shipments was relaxed toward the end of the season last year while every effort is being made this year to move as much tonnage as possible before navigation closes. November, with the entire fleet operating as fully as possible, may show an increase over November, 1945. Details of season shipments to Nov. 1 this year and last are as follows:

	To Nov. 1, 1946	To Nov. 1, 1945
Escanaba	2,660,588	4,201,574
Marquette	2,147,218	3,582,864
Ashland	3,243,615	4,070,860
Superior	16,908,226	23,256,402
Duluth	14,158,551	19,175,774
Two Harbors	12,210,133	16,688,895
Total U.S. Ports	51,328,331	70,976,369
Michipicoten	399,262	414,937
Port Arthur	741,345	107,067
Total Canada	1,140,607	522,024
Grand Total	52,468,938	71,498,393

Decrease from year ago, 19,029,455 tons, 26.62 per cent.

Warehouse . . .

Warehouse Prices, Page 252

Chicago—Warehouses report pressure upon them for steel is greater than at any time during the war, except for alloy steel. Receipts from mills are good, but still run below requirements of consumers. The fact that demand is so heavy beclouds the relatively good volume of steel from mills. Consumers, finding that direct mill shipments fall below the tonnage needed to keep manufacturing operations sustained, turn to distributors for substantial quantities to serve as make-up. Because of the rapid turnover of receipts, warehouses have no opportunity to maintain balanced inventories, the most severe shortages being in sheets and strip, galvanized sheets, small carbon bars and light structurals.

Pittsburgh—With steel distributors' inventories at near record low levels on some items, shipments from stock declined further last month. In most instances mill October deliveries receded from August-September rate, and although some improvement has been noted this month, the outlook is not encouraging through remainder of year. Some warehouse interests state some customers have been forced to reduce production schedules because of inability to get necessary steel requirements, even though they are willing to accept substitute specifications. Distributors state one of chief services warehouse steel salesmen are performing today is that of aiding one customer to find another manufacturer willing to trade steel items which would be beneficial to both. Warehouse inventories of plates, shapes and sheets are nearly depleted in most instances, while stocks of carbon tubing, stainless, alloys and cold-finished items are in fair shape.

Pipe . . .

Some cast iron pipe producers booked up to 15 months ahead, due to pig iron shortage and strikes

Pipe Prices, Page 251

Pittsburgh—Some cast iron pipe producers are booked 12 to 15 months ahead, due to acute pig iron shortage and strikes earlier this year. Delayed shipments have held up most municipal work, while many proposed projects have been temporarily postponed due to extended deliveries. Soil pipe interests have been able to increase output due to increased receipts of pig iron under CPA's certified tonnage program. Exceptional heavy demand is expected to keep jobbers' inventories of standard steel pipe and tubing well below normal for many months to come. Some increase in tubing demand is noted from automotive and railroad industries. Producers are booked well into first quarter on carbon tubing, while alloys are obtainable early in the period. No immediate adjustment in alloy tubing prices is anticipated as a result of price decontrol effective Nov. 1. National Tube Co.'s National Works established new production record last month of 50,146 tons of seamless pipe.

Seattle—Cast iron pipe market remains unchanged. There is a heavy potential demand which will develop as soon as materials are available. Meanwhile, local stocks are practically exhausted and urgently needed material is aboard strike-bound ships.

Cleveland—Huge requirements by the utility companies for steel pipe to service new housing developments loom as an increasing supply problem in 1947. Many utility companies are reluctant to make estimates on supply facilities to new housing developments because of the uncertain supply of steel pipe, among other items. However, one large utility here already has placed its schedule of 1947 requirements in the hands of its suppliers. The 1947 production of buttweld pipe is expected to be about 1,800,000 tons, which would be adequate for essential needs.

Rails, Cars . . .

Track Material Prices, Page 251

Pittsburgh — Carnegie-Illinois Steel Corp. has issued a new extra card, dated Nov. 1, for steel axles embodying a number of important upward revisions in charges for heat treating, boring, etc.

The corporation also has announced that it will discontinue offering guard and girder rails to the trade after Dec. 31, 1947. Carnegie has been handling the sales of these products made at the Lorain plant of National Tube Co., another U. S. Steel Corp. subsidiary. Company officials point out that the space occupied by the old rail mill will be needed under the modernization program at this works.

This action will leave Bethlehem Steel Co. as the lone producer of these items. Annual production of guard and girder rails ranged between 20,000 and 30,000 tons. It is said that use of T-rails for traction purposes is generally becoming accepted as more economical for all tangent applications.

Despite high level of railroad operating efficiency, the current critical car shortage probably will show little improvement through most of 1947. Railroad car shops continue to operate well below capacity due to inadequate supply of plates, shapes, and bars. The preferred steel directives for freight car construction, now up for consideration by CPA, are reported reduced substantially to a more realistic allotment for 21,000 cars. If approved this program will cover first-quarter shipments.

Canada . . .

Toronto, Ont. — While an acute shortage of practically all steel materials persists in Canadian markets, production is gaining in volume at a rapid rate. Most producers are not interested in additional business for this year. However, on any new business that is booked, prices are to be as of time of shipment. Demand for steel is running three to four times actual supply and there is little prospect of mills getting back to full operations on a near-capacity basis until 1947.

Approximately five weeks have passed since the end of the basic steel strike in Canada, and mills gradually are getting back to normal operations, although it will take some weeks longer before all repairs that were held up during the strike period can be completed. Both the Steel Co. of Canada Ltd., Hamilton, and Algoma Steel Corp., Sault Ste. Marie, report employment close to pre-strike levels, and the former which maintained production at 50 to 60 per cent during the strike, is now at approximately 70 per cent of capacity. Dominion Steel & Coal Co., Sydney, N. S., is making good progress despite the fact that it was a week or ten days later than its contemporaries in getting started after the strike.

Ownership of Small Steel Producers Being Changed

(*Continued from Page* 111)

and air conditioning equipment, radio speakers and cabinets and other fabricated products. The rolling mills which it acquired in the Andrews purchase have an annual capacity of 180,000 tons of hot-rolled sheets, of which 60,000 tons may be silicon sheets, 65,000 tons galvanized or galvanealed sheets, and the balance alloys or miscellaneous other grades.

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CO_2 FIRE EXTINGUISHING SYSTEMS

Co. by the Barium Steel Corp. was effected last spring. Originally formed in 1853 as the Central Iron Works the company was reorganized as the Central Iron & Steel Co. in 1897 by consolidation of Central Iron Works with the Paxton Rolling Mills which had been established in 1869. Today the company produces ingots and billets, sheared and universal plates, hot-rolled sheets and skelp, flanged and dished heads, and steel stampings. It has annual open-hearth capacity of 336,000 tons of ingots, and capacity for rolling 182,400 tons of sheared plates, and 105,600 tons of universal plates.

The new owner, Barium Steel Corp., has widespread interests which extend into the metal fabricating field. Barium's holdings include Barium Steel & Forge, Inc., Canton, O., Clyde Iron Works, Duluth, Erie Bolt & Nut Co., Erie, Pa., Globe Forge Inc., Syracuse, N. Y., and through Republic Industries Inc. it controls the Jacobs Aircraft Engine Division, Pottstown, Pa., Kermath Mfg. Co., Detroit, Geometric Stamping Co., Cleveland. Porcelain Steels Division, Cleveland, and Kermath Mfg. Ltd., Ontario, Canada.

Passing of these long-established steel companies to new interests, some of them large consumers of steel, gives rise to the question whether customers of these old firms will have to develop new steel supply sources. In some instances this appears likely. However, it does not apply generally. In the case of the Mahoning Valley Steel Co. it is not yet certain just what policy will be adopted by the new owner. As regards disposition of steel from the old Portsmouth plant of the Wheeling Steel Corp., a large part of the tonnage produced by it is finding its way to the Kaiser-Frazer interests but the plant also has production for sale in the general market. Just what action will be taken with respect to Apollo output after the new purchasers take over is as yet undisclosed. Purchasers of Central Iron & Steel, however, announced at the time of the acquisition that while the new owners would draw upon Central's production to a certain extent, the company will continue to have ample capacity to take care of its regular customers. The same is true as regards the Andrews Steel properties, the new owners stating that the steel facilities will continue to serve many fabricating and manufacturing industries as they have for more than half a century.

Some months ago the Carnegie-Illinois Steel Corp. sold its Farrell steelworks at Farrell Pa., to Sharon Steel Corp., Sharon, Pa. Still another change in the industry concerns the National Supply Co., Pittsburgh, which has begun transfer of its manufacturing activities at Carnegie, Pa., to its plant at Ambridge, Pa. The company's land, buildings and cranes at Carnegie have been sold to the Taylor Forge & Pipe Works, Chicago, manufacturer of welding fittings. The new owner will move into the plant as soon as the space is available. National Supply employs 150 production workers at Carnegie, Pa. It manufactures sucker rods, drill collars and drill stems for the petroleum industry.

Whether acquisition of these smaller steelmaking companies by fabricating and related interests presages a permanent development in the steel economy is uncertain. Future policy with respect to utilization of these steelmaking facilities undoubtedly will hinge upon developments as they unfold when normal conditions return to the steel market. In several of the purchases the new owners have indicated they plan expansion and some modernization of facilities leading to the view that these works are being counted on as permanent fixtures in the purchasers' manufacturing setups.

STRUCTURAL SHAPES . . .

STRUCTURALS PLACED

5000 tons, rayon plant, Tennessee, for American Enka Corp., to Virginia Bridge Co., Roanoke, Va.

1600 tons, reconstruction of bridge A-307, Redland, Okla., for Kansas City Southern railroad; 800 tons each to Kansas City Structural Steel Co., Kansas City, Kans., and Bethlehem Steel Co., Bethlehem, Pa.

500 tons, fertilizer plant, Madison, Wis., for F. S. Royster Guano Co., to Mississippi Valley Structural Steel Co., Decatur, Ill.

450 tons, foundry building, Springfield, Ill., for National Supply Co., to Midland Structural Steel Co., Cicero, Ill.; Fsch Construction Co., Cleveland; bids Oct. 21.

450 tons, addition to welding and machine shop, Whiting, Ind., for Standard Oil Co. (Indiana), to Joseph T. Ryerson & Son Inc., Chicago.

145 tons, 154th St. grade separation, Chicago, for Cook county, to Bethlehem Steel Co., Bethlehem, Pa.; Michael J. McDermott & Co., Chicago, contractor.

100 tons, highway shop, Viroqua, Wis., for state, to Northeastern Boiler & Welding Co., Green Bay, Wis.

100 tons, sheet metal shop, Chicago, for A. Mathis & Sons, Chicago, to Bethlehem Steel Co., Bethlehem, Pa.; L. B. Strandberg & Son Co., Chicago, contractor.

STRUCTURAL STEEL PENDING

7000 tons, Lillian Wald housing development, Avenue D, East River Drive, from East Sixth St. to Houston St., bids to be opened by the New York City Housing Authority, Dec. 3.

280 tons, bridge, Sec. 202V-F, Madison county, Ill., for State Highway Division; bids Nov. 15.

228 tons, sheet piling, for U. S. Engineer, Milwaukee.

200 tons, storage plant, Chicago, for Pure Oil Co.

120 tons, bridge, Sec. 43F, White county, Ill., for State Highway division; bids Nov. 15.

Unstated tonnage, hangars 7, 8, 9, 11 and 12, Washington National Airport, Gravelly Point, Va., bids asked.

REINFORCING BARS . . .

REINFORCING BARS PLACED

750 tons, manufacturing building, Kalamazoo, Mich., for Upjohn Co., to Truscon Steel Co., Youngstown, O. Austin Co., Chicago, contractor.

250 tons, new plant, Chicago, for Sprague-Warner Division, Consolidated Grocers Corp. to Truscon Steel Co., Youngstown, O.; Sherry-Richards Co., Chicago, contractor.

100 tons, die casting plant, Hillside, Ill., for Aluminum Co. of America, to Joseph T. Ryerson & Son Inc., Chicago; John Griffiths & Sons Construction Co., Chicago, contractor.

100 tons, Bow Lake airport, Seattle, to Bethlehem Pacific Steel Co., Seattle.

REINFORCING BARS PENDING

4000 tons, new plant, Chicago, for Aldens Inc., A. Epstein, Chicago, engineer; bids Nov. 1.

4000 tons, Marcy housing development, Brooklyn, bids asked by the New York City Housing Authority.

Unstated, three bridges for Montana highway commission; general contracts placed.

Unstated, two bridge awards, Washington State highway projects in Skagit and Clallan counties.

Unstated, superstructure diesel engine plant, Peoria, Ill., for Caterpillar Tractor Co.; bids Nov. 21.

Unstated, East 34th. St. bridge, Tacoma, Wash., to Guy F. Atkinson Co., Seattle, low bidder at $408,791.

Unstated tonnage, 4-story Henry Street Settlement building, Henry St., New York, De Young & Moscowitz, architects, that city.

Unstated, Amsterdam housing development for New York City Housing Authority, to be located on West End Ave., between 61st and 64th streets, that city.

PLATES . . .

PLATES PLACED

325 tons, Du Pont plant addition, Carney's Point, N. J., to Bethlehem Fabricators, Bethlehem, Pa.

270 tons, Du Pont plant addition, San Francisco, to Clinton Bridge Works, Clinton, Iowa.

250 tons, warehouse, Firestone Tire & Rubber Co., Noblesville, Ind., to Bergen Iron Works, Canton, O.

210 tons, turbo-generator plant, Connecticut Light & Power Co., Montville, Conn., through United Engineers, Philadelphia, to American Bridge Co., Pittsburgh.

105 tons, synagogue, Philadelphia, through Master Masons, that city, to Bethlehem Fabricators, Bethlehem, Pa.

PLATES PENDING

2500 tons, 41,000 feet of 36-in. diameter 5/16 in. steel water pipe for Olympia, Wash.; 300 tons if part award is made for concrete; bids in, award pending.

100 tons, spouts and basins, Cudahy, Wis., for George J. Mayer.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Minneapolis & St. Louis, one 100,000-horsepower Diesel-electric locomotive, to American Locomotive Co., New York.

RAILROAD CARS PLACED

Minneapolis & St. Louis, 600 box cars, to General American Transportation, Chicago.

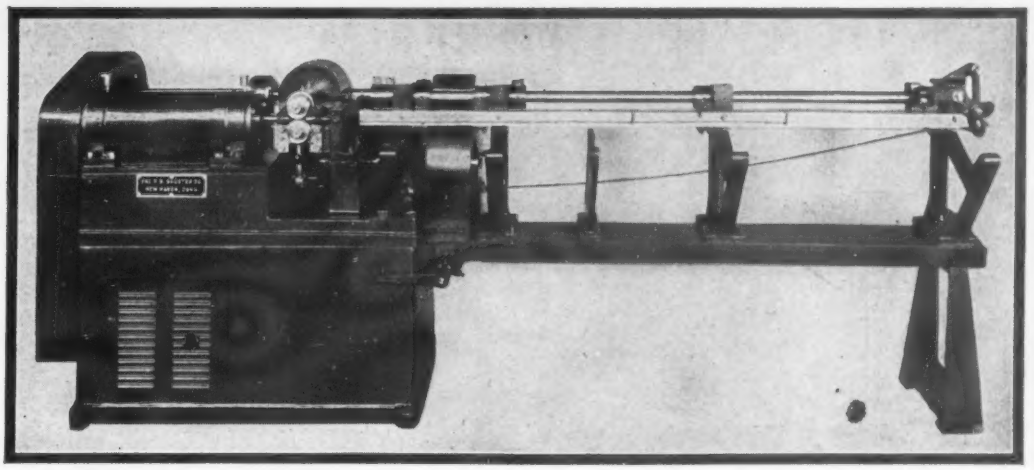
Reading Co., 1000 all-steel hopper cars to own shops in Reading, Pa.

RAILROAD CARS PENDING

Central Railroad of Pennsylvania, 1000 box cars, contemplated.

New York City Board of Transportation, 100 subway cars, bids Dec. 2.

TYPE 2A



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CONSTRUCTION AND ENTERPRISE

CALIFORNIA

BAKERSFIELD, CALIF.—Pacific Gas & Electric Co., San Francisco, has awarded a contract to Stone & Webster Engineering Corp., Los Angeles, for construction of a $10 million, reinforced-concrete steam-operated electric generating plant near this city.

GLENDALE, CALIF.—Williams Radiator Co. has CPA approval for a plant building at 1821 Flower St., 80 x 100 feet, to cost about $30,000.

LOS ANGELES—Jacques Power Saw Co., Denison, Tex., will build a $500,000 assembly plant here.

LOS ANGELES—Steamaster Automatic Boiler Co., 5819 Compton Ave., will build a steel frame addition 63 x 260 feet, to cost about $33,000.

SOUTH GATE, CALIF.—De Long Engineering Works, 5711 Holmes Ave., Los Angeles, has CPA approval for a one-story factory building 64 x 200 feet, and small office structure, to cost $68,720.

VERNON, CALIF.—CBS Steel Co. has let contract to N. J. Karnes, 6136 Ferguson Dr., Los Angeles, for a one-story plant building 40 x 120 feet at 3321 East Slauson Ave., with three-ton monorail crane; also roof over existing crane runway 80 x 80 feet. W. M. Bostock, 8414 Otis St., South Gate, Calif., is engineer.

CONNECTICUT

BRIDGEPORT, CONN.—Bassick Co., plans to build a $250,000 brick and steel factory in this city.

WINDSOR, CONN.—Taylor & Fenn Co., Hartford, plans to build a $300,000 foundry and machine shop, this city. Buck & Buck, Hartford, are consulting engineers.

ILLINOIS

CHICAGO—Jacques Power Saw Co., Denison, Tex., plans to build an assembly plant here. Financing approved for a $500,000 plant.

CHICAGO — Chromium Mining & Smelting Corp. has awarded a contract to W. E. O'Neil Construction Co., this city, for rebuilding a one-story, brick factory building to cost $95,713.

INDIANA

INDIANAPOLIS—Financing has been provided for construction of a $1 million assembly plant here for Jacques Power Saw Co., Denison, Tex.

IOWA

CLINTON, IOWA—Pillsbury Mills Inc., Metropolitan Bldg., Minneapolis, has let contract to Jones-Hettelsater Construction Co., 1012 Baltimore Ave., Kansas City, Mo., for a soy bean processing plant addition, to cost about $200,000.

MICHIGAN

DETROIT—Acme Foundry Co., 2503 22nd St., has CPA approval for a new foundry building to cost $181,000.

DETROIT—Kelsey-Hayes Wheel Co., 3600 Military Rd., has CPA approval for additions and alterations to its aluminum ingot and forging plant at Monroe, Mich.

DETROIT—Cogsdill Twist Drill Co., 12950 West Eight Mile Rd., Oak Park, has CPA approval for a plant addition, to cost about $28,000.

DETROIT—Briggs Mfg. Co. has placed in operation its $250,000 porcelain enameling unit in its plumbing ware division, increasing by 50 per cent the firm's output of plumbing fixtures.

FLINT, MICH.—Construction of a $45,000 steel storage building for AC Spark Plug Division, General Motors Corp., has been approved by CPA.

MARQUETTE, MICH.—Construction of a $30,000 service garage for Olson Motors has been approved by CPA.

OSCODA-AUSABLE, MICH.—Board of Commerce, these towns, is planning to raise funds for purchasing a site for a factory to build small fractional horsepower motors.

TRENTON, MICH.—Construction of a $250,000 factory building for Monsanto Chemical Co. has been approved by CPA.

MISSOURI

JOPLIN, MO.—City will vote Nov. 26 on $1,275,000 bond issue for improvements, including sewage and garbage disposal plants and sewer extensions. Charles A. Haskins, 517 Finance Bldg., Kansas City, Mo., is consulting engineer on these projects.

ST. LOUIS—Variair Conditioner Corp., 4200 Maryland Ave., has been incorporated by J. Elmo Holke and associates to manufacture heating, ventilating and air conditioning devices.

NEW JERSEY

DEEPWATER, N. J.—E. I. du Pont de Nemours, Wilmington, Del., plans to enlarge its synthetic detergent plant here at a cost of about $600,000.

FARMINGDALE, N. J.—Fairchild Engine & Airplane Corp. has plans for altering its factory at a cost of $150,000.

NEW YORK

NEY YORK—Consolidated Edison Co. of New York Inc. plans for four water gas sets at Hunts Point gas manufacturing plant, to cost $6,400,000.

OHIO

ASHTABULA, O.—Preliminary construction on the proposed Timken-Detroit Axle Co. plant is expected to get underway here this fall. Company's brake production will be concentrated at this plant. Initial plans called for a structure 150 x 400 feet in size but these may be revised since CPA approval was for a $140,000 building.

CHAGRIN FALLS, O.—Climax Motor Devices, 27 River Rd., will build plant for manufacture of diesel motor parts, to cost about $30,000.

CLEVELAND—Hallam & Hean Inc. has been incorporated with $2500 capital to manufacture automotive products, by William R. Connelly, attorney, 1956 Union Commerce Bldg., and Paul Hallam.

EUCLID, O.—Thompson Aircraft Products Co. has awarded a contract to Sam W. Emerson Co., Cleveland, for a two-story addition to its X-ray building, estimated cost $80,000.

LORAIN, O.—Eversharp Inc., Chicago, has requested a site here which will house a factory for the manufacture of light cutlery. Expansion plans require 75,000 square feet of space in one or two buildings of mill type.

NEWTON FALLS, O.—Fox-Burch Machine Products Inc. has been incorporated with 250 shares no par value, by Andrew Burch, 493 Vine Ave., and G. M. Thomas, Union Savings & Trust Bldg.

TOLEDO, O.—Toledo Plate & Window Glass Co. has formulated plans for a one-story $1 million factory here.

YOUNGSTOWN, O.—Commercial Shearing & Stamping Co. has awarded a contract to J. P. Lonbard, this city, for a one-story stamping plant addition, to cost about $290,000.

OKLAHOMA

TULSA, OKLA.—Texas Co. plans to modernize and expand its refinery plant here at a cost of $4,500,000.

OREGON

MEDFORD, OREG.—CPA has approved plans for fruit packing and storage plants for Crystal Springs Packing Co., Valley Refrigeration Co. and Northern Refrigeration Co.

PORTLAND, OREG.—Simms Co. has plans for a reinforced concrete building or buildings for industrial use in Guilds Lake area, to cost $1,500,000.

PORTLAND, OREG.—Flintkote Co. has CPA approval for a plant 115 x 480 feet, estimated to cost $278,000, with processing equipment costing $328,805 additional.

PORTLAND, OREG.—Van Waters & Rogers, 2133 NW York St., has let contract to Reimers & Jolivette for a warehouse 171 x 251 feet, to cost about $150,000.

PORTLAND, OREG.—Insulated Steel Homes Inc., D. H. Joyce, president, has plans for fabricating 100 to 200 steel houses monthly, as soon as steel can be obtained, using facilities of Gunderson Bros. shipyard.

PENNSYLVANIA

CREIGHTON, PA.—Pittsburgh Plate Glass Co., Pittsburgh, plans a one-story glass manufacturing plant to cost $750,000. Austin Co., Cleveland, is the engineering firm.

PRIMOS, PA. — W. Stewart Thompson & Phelps Barnum, architects, New York, are asking for bids about Jan. 1, for distribution and office buildings for Crucible Steel Co. of America, Philadelphia. Estimated cost, $72,000.

RHODE ISLAND

PROVIDENCE, R. I.—Chase Brass & Copper Co. has awarded a contract to A. F. Smiley Construction Co., Pawtucket, for a $90,000 factory. C. A. Maguire & Associates, are the architects.

TEXAS

BORGER, TEX.—Standish Pipe Line Co., subsidiary of Phillips Petroleum Co., will build 289-mile 12-inch crude oil pipe line from Goldsmith, Tex., to Borger, with capacity of 70,000 barrels daily.

MIDLAND, TEX.—Stanolind Oil & Gas Co., Houston, has awarded contracts to C. F. Braun Co., Los Angeles, for design and construction of a natural gasoline plant in Slaughter Field and gas lines, to cost about $13,500,000 and $100,000, respectively.

TEXAS CITY, TEX.—Carbon & Carbide Chemical Corp. plans to build chemical plant units to cost over $10 million.

TEXAS CITY, TEX.—Monsanto Chemical Co. plans construction of a polystyrene manufacturing plant to cost about $2,500,000.

TEXARKANA, TEX.—Tex-Ark Rock Wool Corp., J. M. Lile, president, East Ninth St., has been incorporated with $200,000 capital and plans construction of plant for manufacture of granulated and batt rock wool insulation.

WASHINGTON

GRANDVIEW, WASH.—Tea Garden Products Co. has let contract for $133,180 fruit processing plant, including power plant and boiler house.

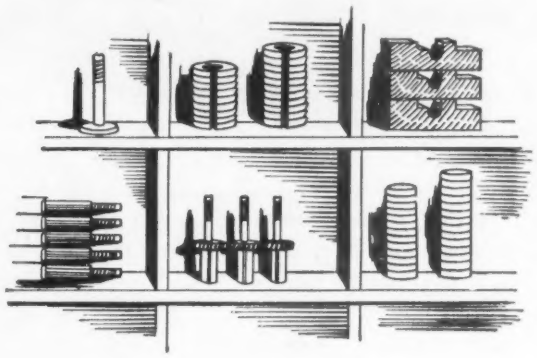
SEATTLE—Alaska Engine Co. soon lets contract for a two-level 100 x 120 foot shop with piers, to cost $200,000. H. Bittman, this city, is architect.

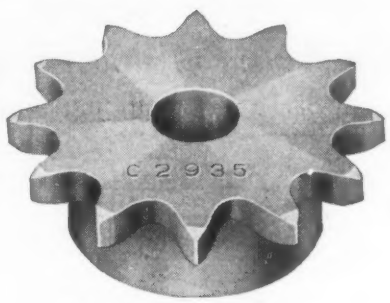
SEATTLE—Puget Sound Sheet Metal Works has voted an increase in capital stock to $320,000 and has bought four acres on East Marginal Way, in preparation for plant expansion.

WISCONSIN

TWO RIVERS, WIS.—Hamilton Mfg. Co. plans a factory addition to cost $150,000.

Clear Marking SPEEDS ORDER FILLING





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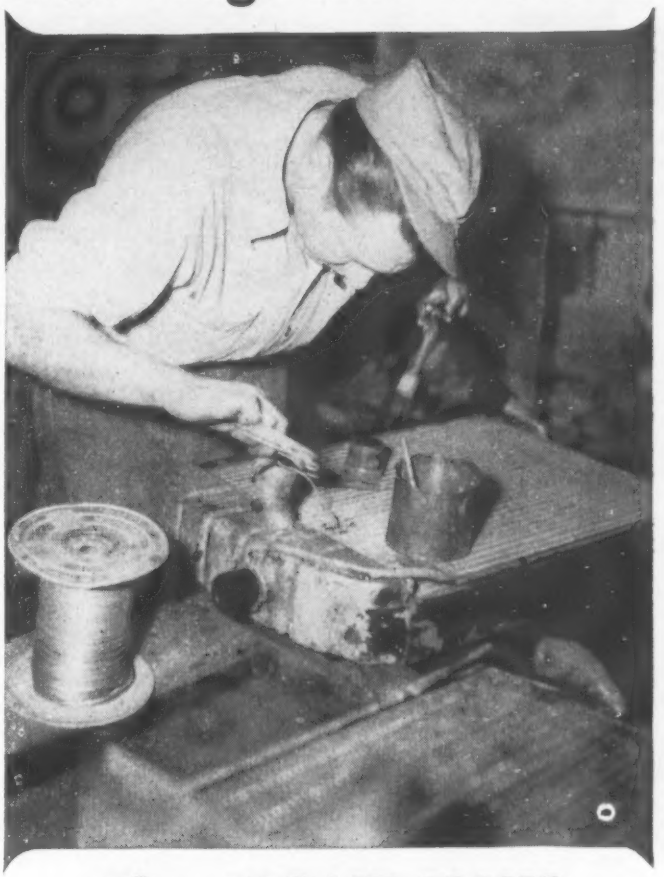

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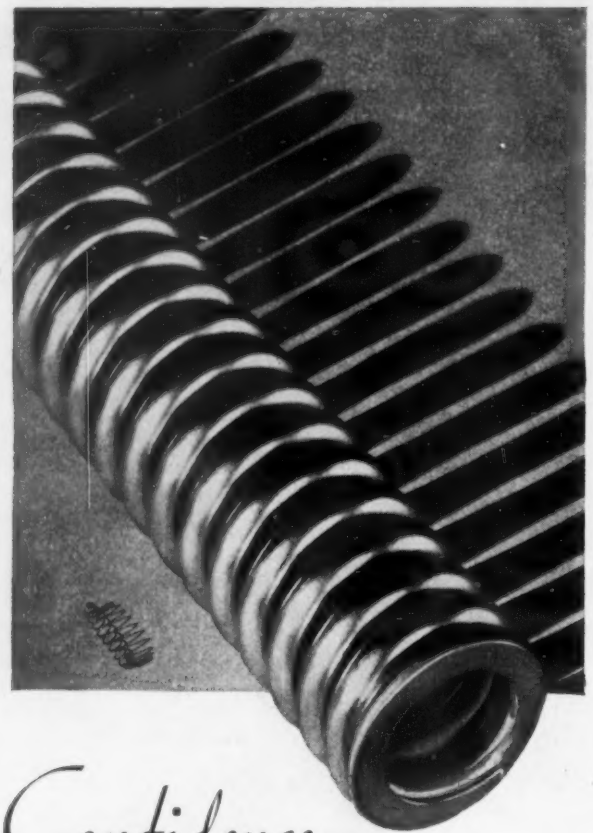

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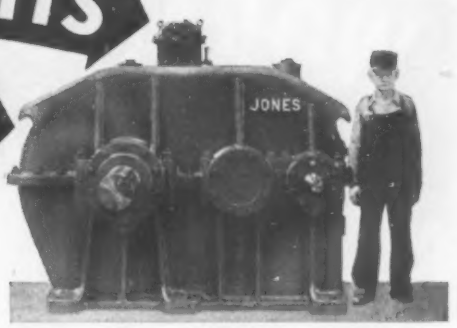

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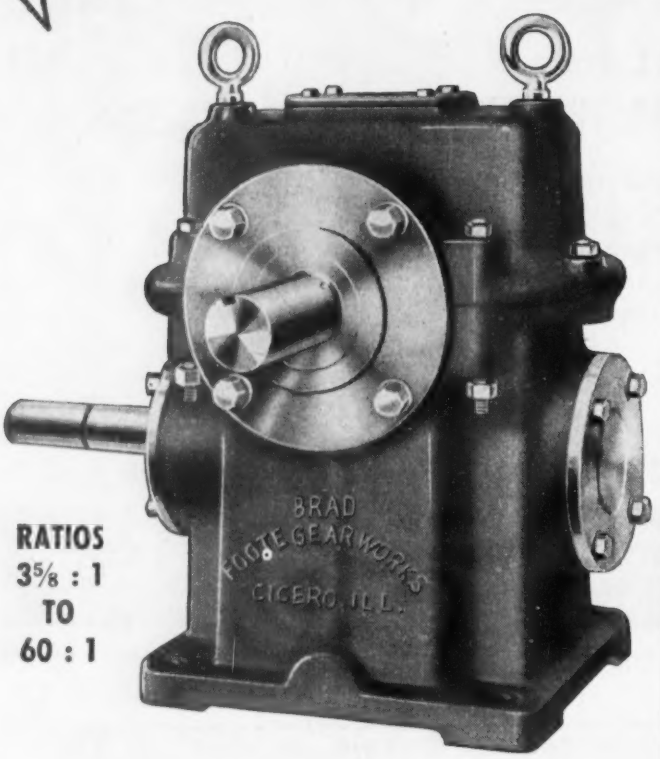

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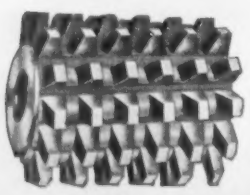

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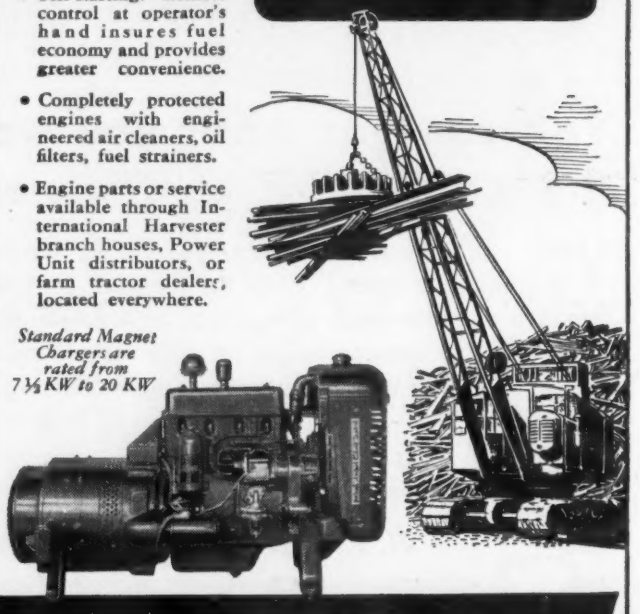

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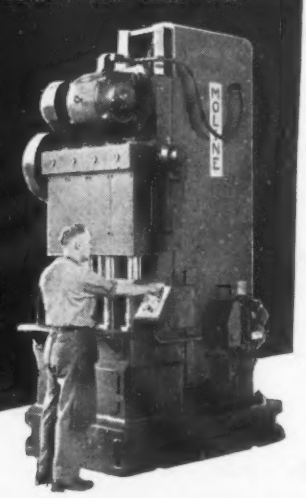

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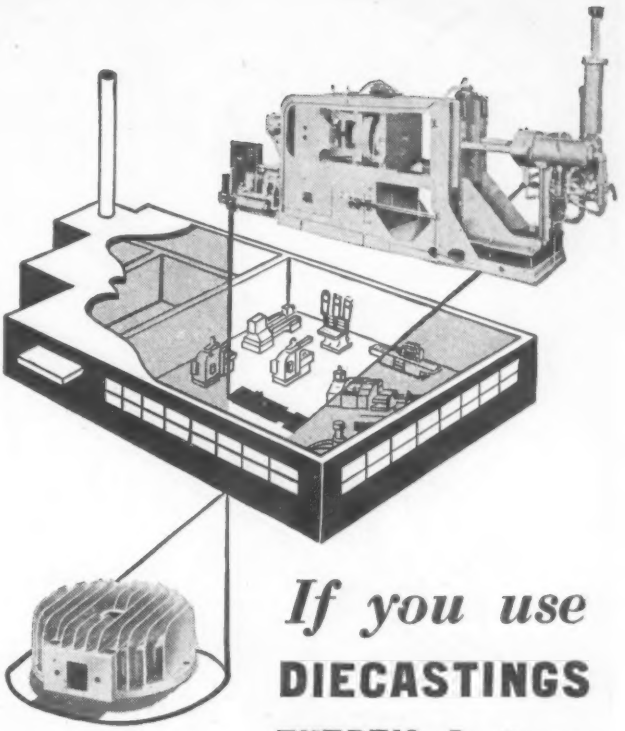

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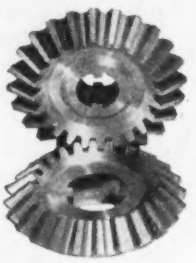

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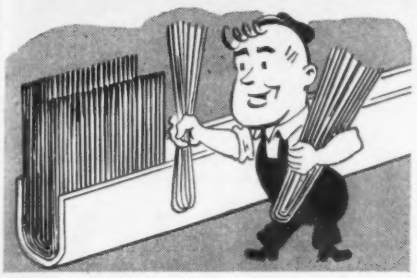

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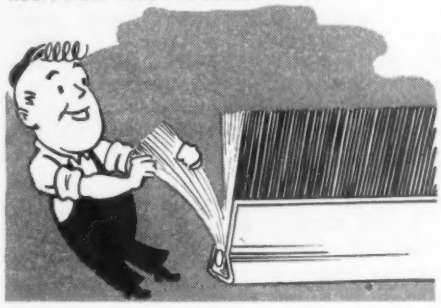

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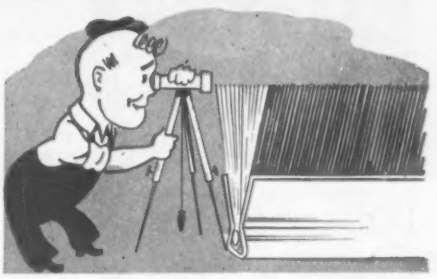

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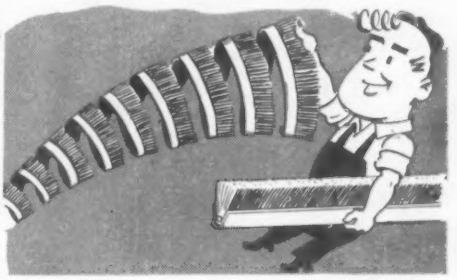

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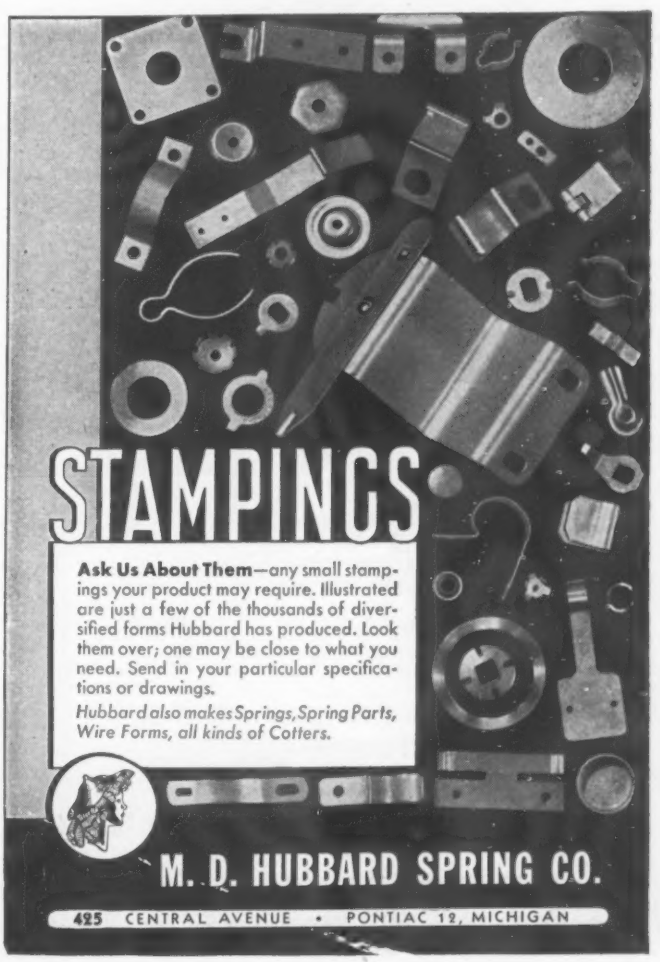

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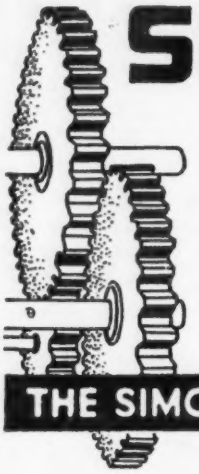

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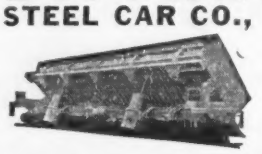

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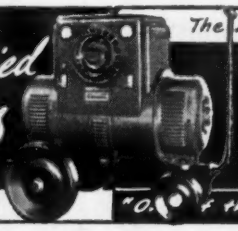

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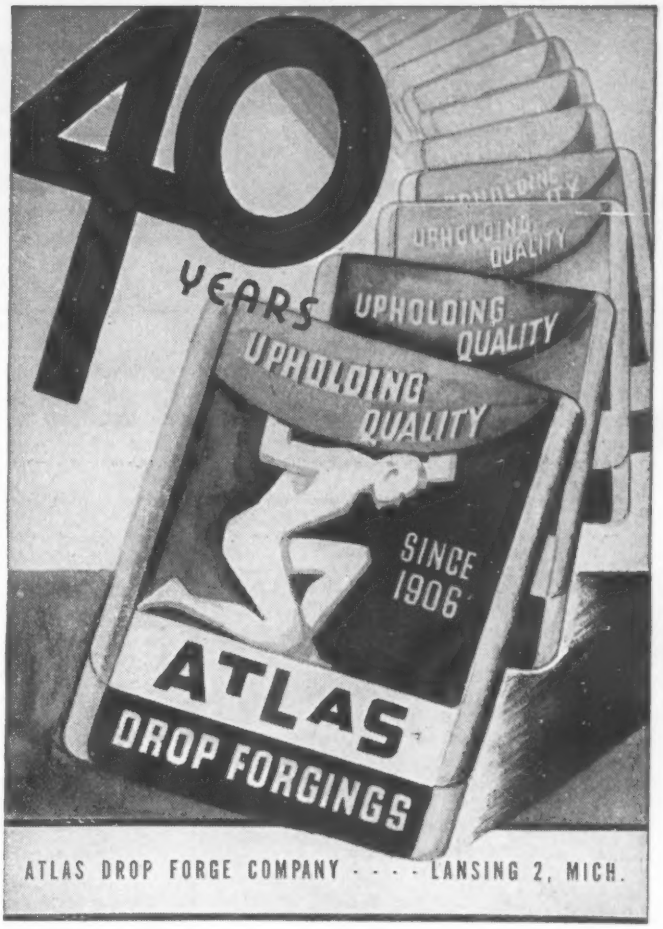

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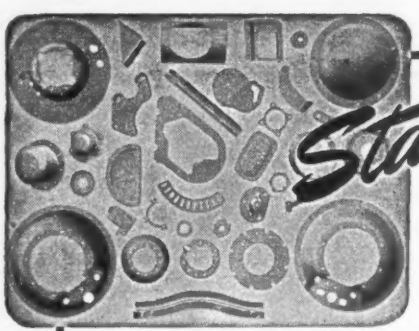

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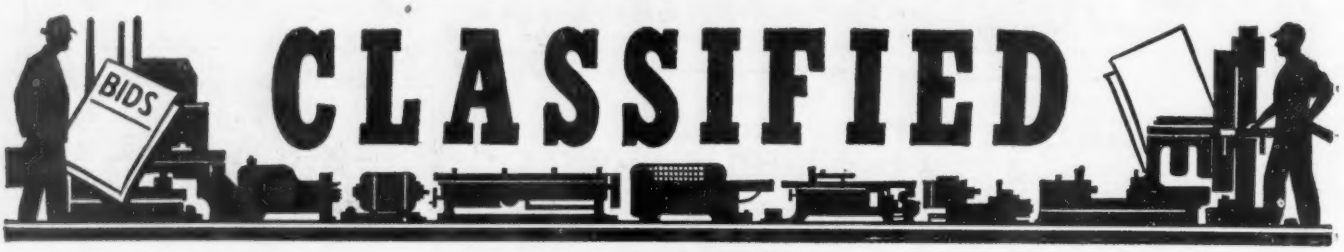

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As the white outline indicates, a standard unit of much greater frame size would be required to do the work of Speedaire.

Photo by courtesy of General Die Casting Corp., Oakland, Calif.

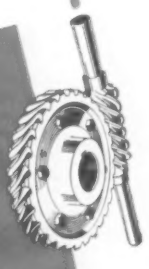
SPEEDAIRE permits compact design

THE increased capacity of Speedaire and the minimum space required for its installation enabled the builder of this Aluminum Die Casting Machine to design a more compact and efficient machine. In addition, Speedaire cost 16% less than a conventional worm-gear unit, saving $39 on each drive.

Speedaire is Cleveland's new fan-cooled worm-gear speed reducer. Because it is fan-cooled, Speedaire will do more work —will deliver up to *double the horsepower* of standard worm units of equal frame size, at usual motor speeds. It can be installed economically on many applications where other types have been used heretofore—giving you the advantages of a compact right-angle drive. Speedaire gives the same long, trouble-free service characteristic of all Clevelands.

For full description, send for Catalog 300. The Cleveland Worm & Gear Company, 3270 East 80th St., Cleveland 4, Ohio.

Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers Limited.



CLEVELAND
Worm Gear
Speed Reducers

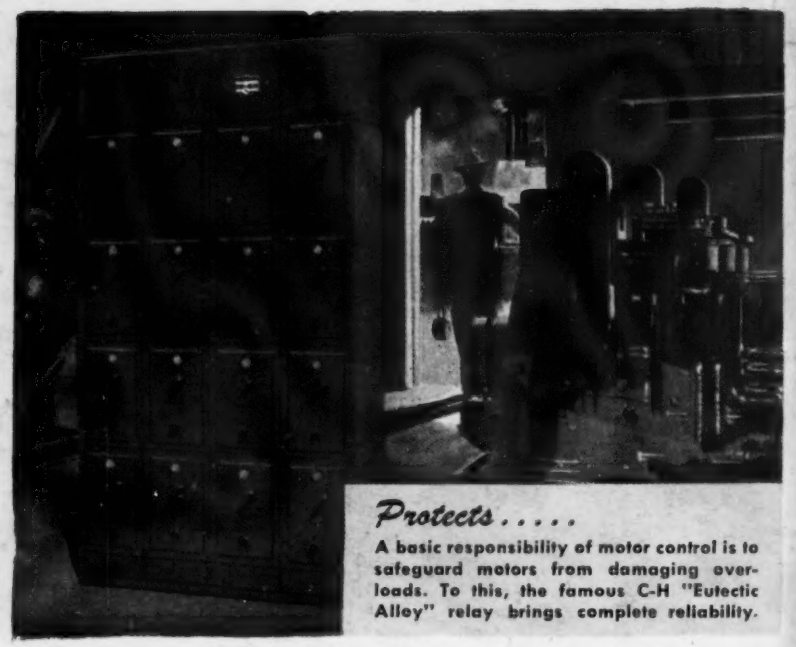
Bettered by Basic Engineering

Starts & Stops . . . . .

The primary function of any motor control is to properly and safely start and stop electric motors. To this, the famous C-H "Vertical Contact" design in the motor control brings trouble-free dependability.

Regulates . . . . .

Precise speed control is vital. To this, such C-H engineering achievements as "Inductive Time Limit", "ac Dynamic" and "Ultraflex" electronic control bring practical perfection.



Protects . . . . .

A basic responsibility of motor control is to safeguard motors from damaging overloads. To this, the famous C-H "Eutectic Alloy" relay brings complete reliability.

America's millions of electric motors do every conceivable type of work from pumping water on farms to driving skillfully coordinated groups of machines in the most complex of industrial processes. Some of these motors, obviously, must be supervised and protected by elaborate and highly specialized control systems. Others need only simple and relatively inexpensive control equipment. But it must be equally obvious that the performance of *each* motor is a vital matter regardless of its particular assignment, its size, or its cost . . . that dependable motor control is *always* a prime necessity.

Cutler-Hammer Motor Control has won such universal preference because it is the product of not only the most extensive specialized motor control experience but the most intensive *basic* engineering. Many of the outstanding examples of Cutler-Hammer engineering leadership improve the *fundamental* functions of motor control. Motors are made to start and stop *dependably*. Speed control is accurate and uniformly *reliable*. Overload protection is both precise and *positive*. It pays to specify Cutler-Hammer Motor Control and refuse all substitutes. CUTLER-HAMMER, Inc., 1211 St. Paul Avenue, Milwaukee 1, Wisconsin. *Associate:* Canadian Cutler-Hammer, Ltd., Toronto.

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